

FLORAE MALESIANAE PRECURSORES XXX THE GENUS *SCLERIA* IN MALAYSIA

by

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GENERAL PART

I. Introduction

After Boeckeler's treatise on the species of *Scleria* known in his day (5), no comprehensive study on the genus has ever been published. The preparation of an up-to-date monograph would be an arduous task, not only owing to the large size of the genus, but also to the numerous problems encountered in its delimitation and its subdivision. Fortunately several very valuable studies on the *Scleriae* of America and Africa have been published lately, which are important precursors to a future monographic treatment. Core (14) revised the American species, Chermeson (8, 9) those of Madagascar, Piérart (24) published a study on the species of Belgian Congo and Ruanda-Urundi, and Nemes (22, 23) gave an account of the genus for the whole of Africa.

The history of *Scleria* has been given by Core and need therefore not be repeated here. I may, however, venture some general remarks on the morphology of the inflorescence, as my views differ in several respects from the current ones. In this connection also the circumscription and subdivision of the genus will be discussed.

II. The inflorescence in *Scleria*

According to Bentham (2, p. 1070) and practically all subsequent authors, in *Scleria* the female flowers are laterally inserted, below the male ones, and the glumes spirally arranged.

It is difficult to decide whether the female flower is really placed laterally. Following Kunth (19, p. 38) morphologists have generally accepted that this

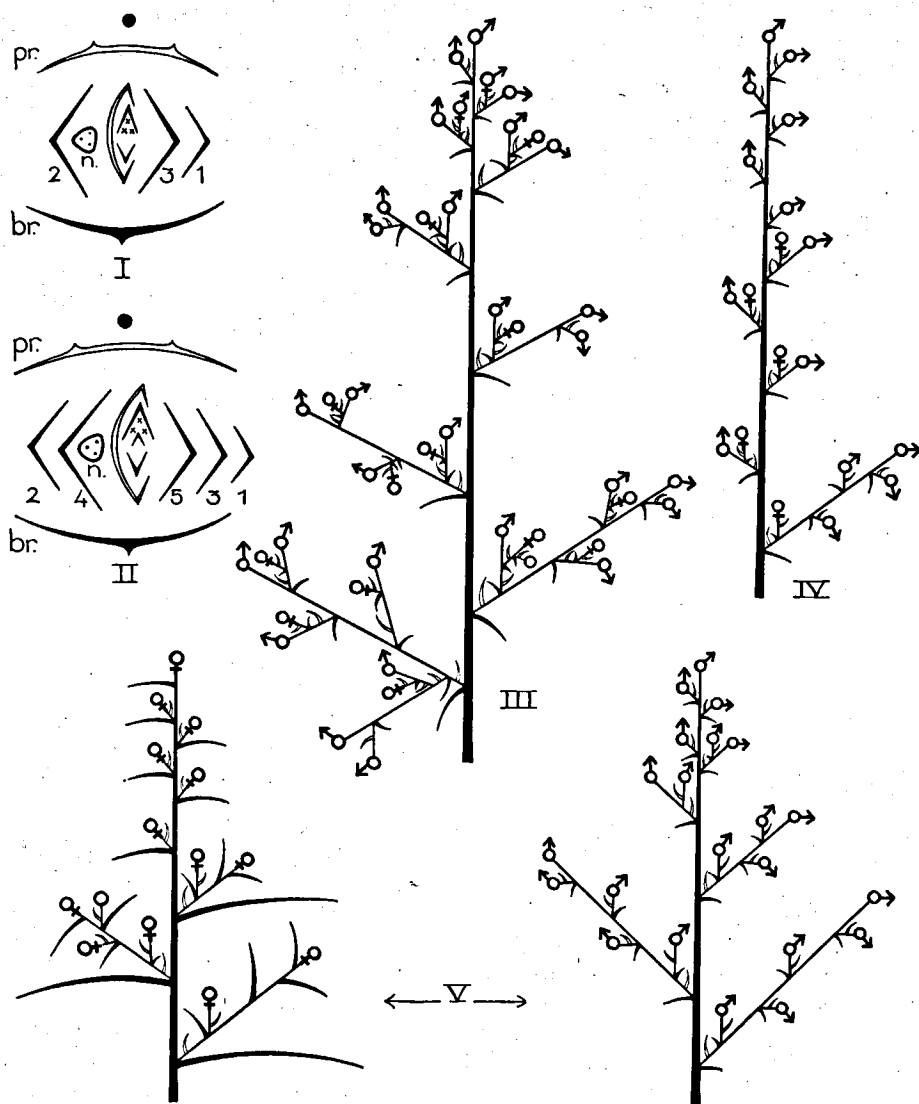


Fig. 1. Diagrams of: I-II. bisexual *Scleria* spikelets; inflorescences of: III. *Scleria sumatrensis* Retz.; IV. *S. poaeformis* Retz.; V. *S. bracteata* Cav.

flower is subtended by the glume marked "2" in diagram I, the axis of the spikelet then being situated between the nut "n" and the third glume "3". As the trigonous nuts in *Cyperaceae* are flattened against the rhachilla, having an edge next to the subtending glume, this view would cover the facts. Nevertheless I am of opinion that a more satisfactory explanation of the spikelet structure can be given. Clarke (10, p. 685) described this structure somewhat inconsistently as follows: "Bisexual spikelet with one female flower below, and a few males above, female spikelet similar, but upper male portion reduced to a small rudiment pressed laterally against the nut or occasionally O (when the female flower appears terminal)."

I assume the female flower is actually terminal. From Clarke's diagrams (13, t. 121 f. 3; t. 125 f. 5) it will be clear that in the bisexual spikelets the median plane of the female part and that of the male one are at right angles to each other. It is the male flowers which are placed laterally with respect to the single female one, as they are apparently borne on a new, lateral axis arising in the axil of the upper glume. Sometimes the prophyll of this subordinate axis is still present, backing the mother axis which is terminated by the female flower, and wrapping the tiny glumes which subtend the male flowers. In other words, the lower 1—2 (sometimes more, see diagram II) glumes are empty, the next one is the bract of a branch bearing the male flowers, which may be more or less reduced or sometimes completely suppressed. This view on the spikelet structure was already put forward by Mattfeld (20): "Bei den *Sclerieae* stehen die weiblichen Blüten terminal. Die sogenannten 'androgynen' Aehrchen von *Scleria* sind (vielfach in Schraubel übergehende) Fächer aus weiblicher Priman- und männlichen Folgeblüten."

The transverse position of the male flowers in the bisexual spikelet may easily have given rise to the conclusion that the glumes in *Scleria* are spirally arranged. However, both in the female and bisexual spikelets they are exactly distichous, as is clearly shown on Clarke's illustrations (13, t. 124 f. 3; t. 126 f. 2, etc.). One may also be misled by the fact that the short ultimate branchlets of the inflorescence are placed in the axil of a more or less glume-like bract, and their spikelets are preceded by a prophyll, both bract and prophyll inserted quite near the base of the spikelet at right angles to the median plane of the latter (transverse distichy). The bract often has a short lamina, the prophyll is recognizable by its being two-keeled. They may have been mistaken for ordinary glumes.

The lower glumes of the male spikelets are also perfectly distichous. With the thinly membranous, tightly packed upper glumes the arrangement seems to be different, possibly also due to branching within the spikelet, but this will hardly be ascertainable.

As a rule the spikelets are grouped in pairs or threes; of each pair the terminal spikelet is male, the lateral one bisexual or female and preceded by a two-keeled prophyll; if there is a second male spikelet this is also preceded by a prophyll proving its lateral position (see diagram III).

There are, however, many exceptions to this rule. For instance, in the widely distributed *Scleria poaeformis* Retz. (see diagram IV) the ultimate branches of the inflorescence are not so much reduced, but elongated with only some of the lower spikelets fascicled, the several to numerous upper male spikelets solitary; in *S. bracteata* Cav. (diagr. Va, b) from America the male spikelets

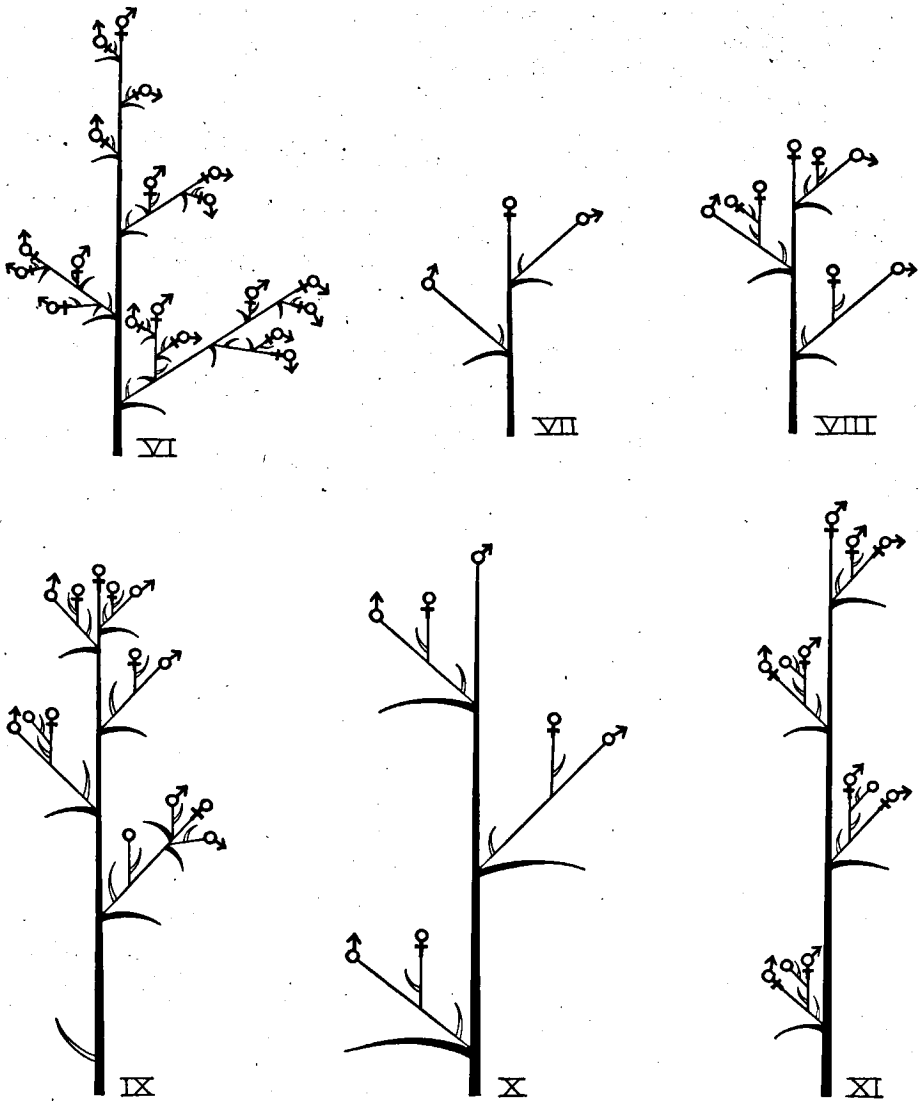


Fig. 2. Diagrams of inflorescences of: VI. *Scleria motleyi* Clarke; VII-IX. *S. caricina* (R. Br.) Benth.; X. *S. rugosa* R. Br.; XI. *S. pergracilis* (Nees) Kunth.

are restricted to the upper part of the inflorescence, the female ones to the lower part; in the Malaysian *S. motleyi* Clarke (diagr. VI) no differentiation into male and female (or bisexual) spikelets has taken place, all spikelets being alike, bisexual; *S. sphacelata* F. v. M. from tropical Australia, otherwise also considerably differing in characters from all other *Scleriae*, is dioecious. Other types of inflorescence structure occur, but the foregoing may suffice to prove

that in *Scleria* neither the male spikelets are always terminal nor the female or bisexual ones always lateral.

However, before entering further into the morphology and circumscription of *Scleria*, the status of *Diplacrum* has to be discussed.

III. History of *Diplacrum*

The genus *Diplacrum* dates from 1810, when Robert Brown (7) based it on a Banks collection from tropical Australia. Both the generic name and the epithet *caricinum* for its sole species refer to the two glumes ("*perianthium bivalve*" of Brown) which tightly clasp the nut and thus simulate a sort of bicuspidate perigynium not unlike the utricle found in *Carex*. Brown suggested the close relationship between the new genus and *Scleria*, especially pointing to the great resemblance in facies of *Diplacrum caricinum* to his *Scleria pygmaea*, also a plant from tropical Australia.

Brongniart (6) figured a plant from Amboina as *Diplacrum tridentatum*, which already in the accompanying text was reduced to *D. caricinum*, and Nees (21) described a *Diplacrum* from Ceylon, *D. zeylanicum*, which Kunth (18, p. 360) also rightly referred to the synonymy of Brown's species.

Boeckeler, certainly the best cyperologist of the second half of the last century, held a different view as to the circumscription of the genus. According to him it comprised also *Scleria pygmaea* R. Br., which Brown had expressly excluded, and *Scleria capitata* Willd., nowadays generally treated as belonging in *Pteroscleria*. Boeckeler saw authentic material of *Scleria pygmaea*, and therefore it is surprising that he referred an essentially differing African plant (*Barter 1041*) to that species. Later on Bentham (2, p. 1071) based his *Scleria africana* on this African collection.

Besides *Scleria* and *Diplacrum* Boeckeler (4) distinguished a third genus, *Sphaeropus*, according to him intermediate between the two, though nearer to *Diplacrum*. *Sphaeropus* was based on an Australian collection (*Schultz 260*), which undoubtedly belongs to *Scleria pygmaea* R. Br. Like Kunth (18, p. 351), Boeckeler obviously overlooked the small male spikelets, which are to be found in every specimen of *Scleria pygmaea* — also in those of Schultz's collection! — and he concluded that he was dealing with a female specimen of a dioecious species.

Earlier, Kunth (17) had shown that the utricle in *Carex* is homologous with the prophyll which as a rule is borne at the base of the branches in *Cyperaceae*, and he had rightly denied (19, p. 40) that the glumes enveloping the nut in *Diplacrum* would be of the same nature. In Bentham's opinion there was consequently no longer any reason to uphold *Diplacrum* as a separate genus, and he merged it with *Scleria* (1).

Serious objections against the congenity of *Diplacrum* and *Scleria* were again raised by Goebel (15) in an important paper on the structure of the spikelets in some Javanese *Cyperaceae*. Goebel came to the conclusion that the distribution of the sexes in the inflorescences and the structure of the nut-bearing spikelets in *Diplacrum* are essentially different from those in *Scleria*, and that for this reason *Diplacrum* had to be placed in *Cryptangieae* of Bentham's own system, not in *Sclerieae*.

In the Flora of British India Clarke (10, p. 688) followed Bentham, but

later on, in the Flora of Tropical Africa (11), he again treated *Diplacrum* as a separate genus, though adding that there is no real line of demarcation against *Scleria*. Here as well as in the posthumously published survey of his system of *Cyperaceae* (12) Clarke merged *Pteroscleria* with *Diplacrum*.

Holttum (16) described a new *Diplacrum* from the Malay Peninsula, and S. T. Blake (3) restricted *Diplacrum* to a group of five small slender annual species of the Old World Tropics, viz *Diplacrum caricinum* R. Br., *D. reticulatum* Holtt., *D. africanum* (Benth.) Clarke, *D. pygmaeum* (R. Br.) Nees ex Boeck., and an unnamed species. There can be no doubt about their close relationship.

IV. *Scleria* and *Diplacrum* compared

Insufficient attention was paid to the remarkable fact that Robert Brown deliberately excluded his *Scleria pygmaea* from *Diplacrum*, "*genus proximum Scleriae, et facie omnino S. pygmaeae*." Boeckeler's transfer of the said species to *Diplacrum* was accepted without any comment by those authors who kept this genus apart, and also Bentham (2, p. 1071), who did not recognize *Diplacrum* as a separate genus, considered *Scleria pygmaea* a species "*S. caricinae arcte affinis*."

In what respect then did Brown's concept of *Diplacrum* differ from that of subsequent authors? I think a most essential difference between *Diplacrum caricinum* and *Scleria pygmaea* observed by Brown, and, to him the crucial character for generic separation, was afterwards overlooked or neglected: in *Diplacrum caricinum* the glumes fall off with the ripe nut which they enclose, in *Scleria pygmaea* they are persistent on the peduncle after the falling out of the nut. Hence Brown's terminology in *Diplacrum* "*perianthium bivalve*" versus that in *Scleria pygmaea* "*squamis femineis aristato-acuminatis*". In *Diplacrum reticulatum* Holtt. the glumes behave like in *D. caricinum*, and Brown would certainly have taken them for the perianth; in the other species included by Blake they behave like in *Scleria pygmaea*.

Although Brown's main character of *Diplacrum* does not hold for the genus as circumscribed by Blake, one may ask whether generic segregation is unjustified for this reason alone. For, Brown may have failed in the interpretation of the glumes enveloping the nut, his diagnosis of the inflorescence in *Diplacrum*, though incomplete, is quite in accordance with the results of Goebel's investigations: "*Fasciculi androgyni. Masc. lateralis, squamis scariosis. Fem. intermedius*."

Goebel described the inflorescence as follows: female spikelet terminal, with a single, terminal flower surrounded by two glumes, not rarely a vestigial bud in the axil of the upper glume; male spikelets lateral, in the axils of bracts below the female spikelet; in more compound inflorescences, however, these bracts subtend partial inflorescences, so that the whole cluster in the axil of a primary bract may contain five or even more female spikelets (see diagrams VII—IX).

According to Goebel the structure in *Scleria* is essentially different: here the female spikelets are basal off-shoots of the male ones, with the female flower placed laterally, below some glumes which may be empty or occasionally bear a male flower.

The situation is, however, much more complicated. Goebel examined only

two species, *Diplacrum caricinum* and an unidentified Javan *Scleria*, so that his far-reaching conclusions may be called somewhat premature. I have already pointed out that the female flower in *Scleria* is terminal, just like in *Diplacrum*. In the nut-bearing spikelets of several *Scleria* species the empty glumes mentioned by Goebel are completely suppressed, reduced to a vestigial axillary bud also occurring in *Diplacrum*. As to the disposition of the female and male spikelets, it should be remembered that here the terms "terminal" and "lateral" can not be used in an absolute sense. In diagram VII the male spikelets are indeed lateral with respect to the single female one, but so are several of the female spikelets in diagrams VIII—IX with respect to the male ones. It is self-evident that the disposition of spikelets called characteristic of *Scleria* is not found in many of its species, such as *S. poaeformis*, *S. bracteata*, *S. motleyi*, *S. pergracilis* (diagr. XI), *S. sphacelata*, and others. In *Scleria rugosa* R. Br. (= *S. flaccida* Clarke), which certainly does not belong to *Diplacrum*, I find the main axis terminated by a male spikelet, but the branches are of exactly the same structure as in *Diplacrum caricinum* (see diagram X). If Clarke's figures of *S. flaccida* (13, t. 127 f. 3—5) are correct, the inflorescence can in details be structured as in *Diplacrum*. According to me the inflorescence in *Diplacrum* represents but one of the numerous variations in type occurring in *Scleria*.

Some other characters have been mentioned as being found in *Diplacrum*, not in *Scleria*. Three-lobed glumes of the female spikelets are characteristic of some *Diplacrum* species, but they are not found in *D. reticulatum* Holtt. nor in *Scleria pygmaeopsis*, which close ally of *Scleria pygmaea* will be described below. In all *Diplacra* there are only two glumes enveloping the nut, but their number in *Scleria* is far from being constant, ranging from three to six. The number of stamens, probably always one in *Diplacrum*, varies in *Scleria* between one and three. Blake (3) is of opinion that the nut in *Diplacrum* differs from that in *Scleria*, the former tending to be heavily ribbed vertically, but *Diplacrum reticulatum* was named after the reticulated nut, and in *Scleria laxa* R. Br. the vertical ribs are very prominent.

Taking into account all the above-mentioned facts, I fail to see any valid point of generic discrimination between *Diplacrum* and *Scleria*. As regards Goebel's assertion that *Diplacrum* should be removed to *Cryptangieae*, I am of opinion that in Bentham's system the assignment of the various genera to *Sclerieae* or *Cryptangieae* is very unnatural, as intimately related genera, such as *Kobresia* and *Carex*, or *Pteroscleria* and *Scleria*, were placed in different tribes.

V. On *Sphaeropus* Boeck.

Scleria pygmaea, as compared with *Diplacrum caricinum*, is not only remarkable on account of the behaviour of its glumes and nut, but also on account of another character which seems to be just as much neglected, though it was already mentioned by Kunth (18, p. 351): "*squamis duabus interioribus ovato-ellipticis ex his inferiore basi subgloboso-tumida*." The generic name *Sphaeropus*, based on the same species, obviously alludes to this character: the peculiar, strongly swollen apex of the peduncle, spongy by the much inflated cells (see 13, t. 134 f. 2). Boeckeler took this apex for a part of the perigynium: "*Perigynium duplex: superius diphyllum; inferius*

(*e bracteolis confusis tribus formatum*) *pedicellatum crassiusculum globoso-trigonum, vertice leviter depressum, celluloso-reticulatum pallidum.*"

The character seems to be more or less correlated with that of the behaviour of the glumes and nuts, for it is only pronounced in those species of *Diplacrum* as understood by Blake, with glumes persistent on the peduncle, not in those in which the glumes fall with the nut. Two presumably natural groups can therefore be distinguished (see below).

VI. Staminodes in *Scleria*?

As is frequently the case in anemophilous flowers, the filaments in *Scleria* strongly lengthen before anthesis. After the pollen has been discharged, the anthers fall from the persistent, more or less strap-shaped filaments. Throughout *Cyperaceae* such filaments can be observed. De Wildeman (27) studied them in some African *Scleriae*. He supposed them to be destitute of anthers from the beginning and for this reason an example of the regression of the androecium in plants with active vegetative propagation. Piérart (24, p. 9) affirmed the occurrence of 'staminodes' in all or at least in all Congolese *Scleriae* and mentioned also organs intermediate between stamens and staminodes.

However, as in young spikelets no sterile filaments are to be found, and in deflorate spikelets all filaments look like staminodes because of the disappearance of the anthers, there is in my opinion no reason whatever to accept the occurrence of staminodes in the flowers of *Scleria*.

VII. The sections of *Scleria* represented in Malaysia

In Clarke's papers on *Cyperaceae* and also in those of Nelmes, the genus *Scleria* is — apart from some exclusively American or African groups — subdivided into two subgenera, *Scleria* proper and *Hypoporum*. During my work on the Malaysian members of the genus the question arose whether these subgenera are also acceptable for the grouping of the species under consideration.

Nees's excessive and far from natural splitting up of the *Scleriae* known in his day into some fifteen small genera, we may pass almost without comment, as only a few Asiatic species are involved. For nomenclatural reasons it may be remarked that even the two species on which Bergius based the genus, were excluded from *Scleria*. Nees's system, which rested almost solely on the greatly varying shape of the hypogynous disk, was not accepted by any subsequent author, but several of his generic names have later on been used for designating subgenera or sections.

Only two of the segregated genera contained Asiatic species. The monotypic genus *Cylindropus* was based on the Ceylonese *Cylindropus junciformis* Nees (*Scleria pilosa* Boeck.; *S. junciformis* Thwaites, non Kunth). It was defined as follows: "*Nux perigynio arcto cylindrico truncato basi constricta.*" Already Endlicher rightly united it with *Scleria*.

Hypoporum was published in the Edinburgh New Philosophical Journal of 1834. Here it contained only two species, *Hypoporum pergracile* and *H. capitatum*. As the latter species was excluded from *Hypoporum* by Clarke (10, p. 689: "not a *Hypoporum*"), the former has to be considered the type species of the genus.

Obviously Nees had a much wider circumscription of the genus in mind, for in Linnaea 9 of 1835 a large number of *Hypoporum* species were enumerated. However, neither the original diagnosis "*spiculae androgynae*; *foeminea infera, masculum terminalem amplexens*," nor that in the Flora Brasiliensis II, 1, 1842, p. 158 ("*spiculae androgynae, feminea masculam infraterminalem* [sic!] *includens*") fit the strictly unisexual spikelets of *Hypoporum capitatum*. The transfer of *Scleria lithosperma* to *Hypoporum*, generally cited as dating from 1834, was made only in 1842.

Kunth, to whom *Cylindropus* was only known from the description, provisionally upheld this genus in his Enumeratio, but *Hypoporum* was merged with *Scleria*. The reasons were explained in Kunth's paper on the *Sclerineae* and *Caricineae* (19, p. 39): "Herr Nees von Esenbeck scheint den Discus in einer Abtheilung dieser Gattung [= *Scleria*], wo er sich stiel förmig zeigt, gänzlich übersehen zu haben, denn seine Gattung *Hypoporum*, welche jene Arten in sich begreift, soll sich von *Scleria* durch die Abwesenheit des Perigynium's unterscheiden. Hiernach scheint kein Grund vorhanden zu sein, die Gattung *Hypoporum* beizubehalten, zumal da die übrigen Merkmale, welche von der äussern Beschaffenheit des Pericarpiums hergenommen sind, mir weder wichtig genug erscheinen, noch in allen Neesischen Arten angetroffen werden."

When Clarke in 1894 (10, p. 685 & 686) divided the Indian *Scleriae* into two subgenera, he took up the name *Hypoporum* for one of them. Because, for the circumscription of the genera in *Cyperaceae* and their subdivisions, he laid stress mainly on the distribution of the sexes in the spikelets, *Hypoporum* was defined as having many bisexual spikelets, in contradistinction to *Scleria* proper with none or few. In consequence of this definition, Clarke was obliged to include *Scleria corymbosa*, with many bisexual spikelets and a much reduced disk, in *Hypoporum*, although it will be evident that its placing in one subgenus along with *Scleria pergracilis* and the numerous African and American allies of the latter must be erroneous.

More difficulties arose when Clarke described the Malaysian *Scleria motleyi*, for in this species all the spikelets are bisexual, but the disk is well-developed. Originally it was placed under the heading "Many of the spikelets (apparently) 2-sexual", along with *Scleria lithosperma* and *S. corymbosa*, but later on (12, p. 132) in a new subgenus, *Browniae* ("*E spiculis plures androgynae. Discus obvius*").

From the foregoing account it will be clear that neither on the ground of the development of the hypogynous disk, nor on that of the distribution of the sexes in the spikelets, the Malaysian *Scleriae* can be divided into two subgenera. If the much reduced (but not absent!) disk is taken for the crucial character of *Hypoporum*, *Scleria neesii* (= *Hypoporum capitatum*) has to be placed in this subgenus, but its close ally *S. carphiformis* in *Scleria* proper. The accommodation into one subgenus of those species with bisexual spikelets would be even more artificial. Bisexual spikelets are found in *Scleria pergracilis*, *S. lithosperma*, *S. corymbosa*, *S. motleyi* and its allies, but are moreover not rare in *S. biflora*, *S. annularis*, *S. tricuspidata*, and *S. novae-hollandiae*. In the stout, perennial species, such as *Scleria terrestris*, *S. poaeformis*, *S. scrobiculata*, and their allies, the male part of the nut-bearing spikelets is usually reduced to a sterile glume which sometimes may be absent, but a single or some male flowers besides the female one are often present in *Scleria psilorrhiza* and *S. junghuhniana*.

De Wildeman (26) criticized Clarke's subdivision of *Scleria*, but did not propose any correction. In my opinion the way out of the difficulties seems to be the distinction of groups (sections) of apparently more or less closely related species. An attempt to this subdivision is given on p. 151. I am well aware of the shortcomings of this survey. *Scleria cyathophora* may be misplaced, for it has much in common with the species of *Sect. Scleria*. The species with 'whorled' leaves might possibly be united in a separate section. *Scleria corymbosa* and *S. lithosperma* agree with each other in so many characters that I have ventured to place them in the same section, though with great hesitation. It is doubtful whether the remarkable differences between *Sphaeropus* and *Diplacrum* justify their separation on sectional level. The fact that I am not sure whether *Sect. Carphiformes* has rightly been inserted under the perennial species, is less important.

A few remarks may be made on *Subgen. Schizolepis* (Nees) Clarke, though it only comprises American and African species. It is characterized by the fimbriate or serrate margin of the hypogynous disk. Both Core and Nelves say that in "*Euscleria*" this margin is entire, which is not true for several Malaysian species. In *Scleria levis*, *S. oblata*, *S. terrestris*, and *S. ciliaris* the disk-lobes are often minutely denticulate, and in *S. sumatrensis*, *S. scrobiculata*, *S. polycarpa*, and *S. purpurascens*, the pronounced denticulation is hardly if at all different from that in some *Schizolepis* species. As an additional character in *Schizolepis* Clarke (Fl. Cap. 7, 1898, 294) mentions "leaves broad, the margins praemorse at unequal distances from the top." However, praemorse leaves are also found in some Madagascan and American species belonging to *Scleria* proper, and in one Asiatic species of *Sect. Scleria*, viz *S. psilorrhiza* (see p. 177). If *Schizolepis* is to be upheld as a subgenus or section, its diagnosis needs emendation.

Piérart (24, p. 63) presumed an evolution in *Scleria* from bisexual spikelets to unisexual ones correlated with the gradual development of the hypogynous disk. Nelves (22, p. 415) considered bisexual spikelets also primitive, but felt inclined to the opinion that the disk has tended to become reduced and vestigial. The interrelationships of the Malaysian species are so very complicated that it seems impossible to trace a rectilinear development.

VIII. Acknowledgements

I wish to express my indebtedness to the Directors of the Herbaria who sent on loan the rich material cited in the systematic part of the present paper. Dr. S. T. Blake, Brisbane, had already revised a large part of the Malaysian specimens, when I took over their study. His identifications have been a great help to me. My thanks are also due to Mr. E. A. Robinson, who generously placed at my disposal his manuscript on the annual species of *Scleria*, *sect. Scleria* represented in Africa. This manuscript contains many valuable emendations on Nelves's papers.

SPECIAL PART

SCLERIA Berg.

Kongl. Vet. Acad. Handl. Stockholm 26, 1765, 142, t. 4, 5; Boeck., Linnaea 38, 1874, 436—542.

Type species: *Scleria flagellum-nigrorum* Berg. (cf. Core, Brittonia 2, 1936, 88).

Diplacrum R. Br., Prodr. Fl. Nov. Holl., 1810, 240.

Type species: *Diplacrum caricinum* R. Br.

Sphaeropus Boeck., Flora 56, 1873, 89.

Type species: *Sphaeropus pygmaeus* Boeck.

Monoecious, exceptionally dioecious. Perennial, often stout herbs with short or creeping, often nodose rhizome, or annuals with fibrous roots. *Stems* solitary or more or less tufted, mostly erect, sometimes scrambling over bushes, trigonous or triquetrous, leafy in the lower part or throughout, smooth or scabrid. *Leaves* 3-ranked, narrowly to broadly linear, sheathing the stem, smooth to very scabrous on the margins and the main nerves, the lower ones reduced to bladeless or almost bladeless sheaths; midnerve prominent beneath, 2 lateral nerves prominent above; blades sometimes 'premorse' (the proximal part broad, 5-nerved, suddenly narrowed at unequal distances from the top into the 3-nerved distal part); sheaths closed, not rarely 3-winged, eligulate, the apex on the ventral side truncate or produced into a tongue (contraligula). *Inflorescence* paniculate, consisting of a terminal partial panicle and usually some lateral ones, sometimes reduced to dense clusters, or glomerate-spiciform with glume-like bracts. *Spikelets* all bisexual, or bisexual and male, or female and male; bisexual spikelets composed of 1 terminal female flower and 1—several lateral male ones; female spikelets with 1 female flower and not rarely 1—2 lateral empty glumes (the reduced male part); male spikelets with several to numerous flowers. *Glumes* (except for the upper ones of the male spikelets and of the male part of the bisexual spikelets) distichous, in the lateral spikelets at right angles to the pertinent bract and prophyll, the lower 2—4 empty. *Flowers* unisexual, achlamydeous, the male ones consisting of 1—3 stamens with free, rarely connate filaments, and oblong to linear anthers with more or less produced connective; female flowers with a 3-carpellate pistil; style continuous with the ovary, caducous, the base often persistent on the nut; stigmas 3, filiform. *Nut* globose, ovoid, ellipsoid, or pyramidal, terete or trigonous, smooth or variously sculptured, glabrous or hairy, with crustaceous pericarp, white, more rarely bluish, ultimately often discoloured, shining, more rarely dull, borne on a gynophore (cupula), which is dilated at the apex into a more or less trilobate, but sometimes much reduced, disk adhering to the ripe nut; outer cells of nut very small, quadrate-hexagonal.

Distribution: Large genus of about 200 species, mainly pantropical, but in N. America and Japan extending beyond the 40th N. parallel, and in S. America and S. Africa reaching the 35th S. parallel; see map in Piérart, Lejeunia, Mém. 13, 1951, 18.

In Malaysia 34 species.

Notes. 1. The tongue-shaped appendage into which the top of the ventral side of the leaf-sheath in many *Scleriae* and several *Carices* is drawn out, is

generally referred to as "ligula". Senay (Bull. Mus. Hist. Nat. Paris II, 22, 1950, 619) proposed the name "antiligule", and Chermeson (Rev. Gén. de Bot. 38, 1926, 343) the name "pseudoligule". For linguistic reasons I prefer to name it 'contraligula'.

2. For the following species, which are more or less common in Malaysia and represented by numerous sheets in the various herbaria, I have restricted the account of the material studied to a brief enumeration of the collectors' numbers, without indication of herbaria and precise localities: *Scleria levis*, *S. oblata*, *S. terrestris*, *S. ciliaris*, *S. sumatrensis*, *S. scrobiculata*, *S. purpurascens*, *S. lithosperma*, *S. biflora*, and *S. caricina*.

Conspectus of the Malaysian Scleriae

This concise survey of the taxa represented in Malaysia is not intended as a key to the species

1. Perennials.
 2. Glumes glabrous or minutely hairy. Spikelets not in globose clusters, at most 6 mm long.
 3. Hypogynous disk well developed.
 4. Nut-bearing spikelets bisexual (not always in *S. cyathophora*). Nut usually trigonous. Glumes shortly hairy *Sect. I. Browniae*
 5. All spikelets bisexual. Nut prominently trigonous, conical with flat sides.
 6. Nut erostrate 1. *S. motleyi* ssp. *motleyi*
 6. Nut rostrate 1a. *S. motleyi* ssp. *rostrata*
 5. Strictly male spikelets present. Nut less prominently trigonous.
 7. Disk not cyathiform.
 8. Disk not lobed 2. *S. densispicata*
 8. Disk 3-lobed; lobes very broad, truncate, membranous.
 9. Leaves crowded at the base of the flowering stems, moreover 1—2 higher up 3. *S. papuana*
 9. Leaves about equally distributed along the flowering stems 4. *S. brownii*
 7. Disk cyathiform 5. *S. cyathophora*
 4. Nut-bearing spikelets usually unisexual, the male part reduced to a sterile glume or sometimes to 1—2 flowers. Nut terete or obscurely trigonous. Glumes glabrous or minutely ciliate *Sect. II. Scleria*
 10. Leaves about equally distributed along the flowering stems.
 11. Disk-lobes acute, lanceolate or almost so.
 12. Disk-lobes muticous 6. *S. levis*
 12. Disk-lobes mucronulate by a short stiff point 7. *S. benthamii*
 11. Disk-lobes broadly rounded.
 13. Nut depressed-globose 8. *S. oblata*
 13. Nut globose or ovoid.
 14. Inflorescence consisting of a terminal panicle and 1—several lateral ones, the latter subtended by foliaceous bracts. Spikelets in clusters of 2—4.
 15. Nut at most 3 mm long, usually shorter, apiculate.
 16. Contraligule with a membranous appendage which is broader than long, band-like 9. *S. terrestris*
 16. Membranous appendage of the contraligule much longer than broad, lanceolate 10. *S. ciliaris*
 15. Nut large, at least 3 mm long, muticous.
 17. Contraligule with cartilagineous margin, not

- appendaged. Inflorescence dense, narrow
 11. *S. psilorrhiza*
 17. Contraligule with a membranous appendage. Inflorescence ample, very open
 12. *S. junghuhniana*
 14. Inflorescence a single terminal panicle without leafy bracts. Spikelets solitary, evenly distributed along the branches 13. *S. poaeformis*
 10. Leaves (falsely) whorled.
 18. Disk large, cyathiform 14. *S. sumatrensis*
 18. Disk not cyathiform.
 19. Nut-bearing spikelets rather evenly distributed throughout the obliquely erect branches of the partial panicles.
 15. *S. polycarpa*
 19. Nut-bearing spikelets chiefly restricted to the base of the spreading branches of the partial panicles.
 20. Nut white, scrobiculate, rarely smooth.
 21. Nut globose or ovoid, $2\frac{1}{2}$ —3 mm high
 16. *S. scrobiculata* ssp. *scrobiculata*
 21. Nut depressed-globose, $1\frac{1}{2}$ mm high
 16a. *S. scrobiculata* ssp. *discocarpa*
 20. Nut soon discoloured, cancellate 17. *S. purpurascens*
 3. Hypogynous disk much reduced, obsolete. Nut-bearing (or all) spikelets bisexual. Nut trigonous, with 3 basal depressions . *Sect. III. Corymbosae*
 22. Partial panicles copious, dense, corymbiform 18. *S. corymbosa*
 22. Partial panicles very loose, with almost spiciform branches.
 23. Nut smooth except for the rugulose depressions at the base
 19. *S. lithosperma* var. *lithosperma*
 23. Nut rugulose throughout 19a. *S. lithosperma* var. *linearis*
 2. Glumes long-hairy. Spikelets in a dense, globose, terminal cluster, 1—2 smaller lateral clusters whether or not added. Spikelets large, (6—)8—9 mm long
Sect. IV. Carphiformes
 24. Hypogynous disk well developed 20. *S. carphiformis*
 24. Hypogynous disk reduced to a columnar stipe 21. *S. neesii*
 1. Annuals.
 25. Inflorescence linear, spiciform, unbranched, without leafy bracts
Sect. V. Hypoporum
 22. *S. pergracilis*
 25. Inflorescence otherwise, with leafy bracts.
 26. Nut-bearing spikelets with at least 3 glumes *Sect. VI. Tessellatae*
 27. Nut with 2 basal deep pits in each sinus of the disk-lobes, regularly cancellate, the lacunae mostly square to broader than long.
 28. Disk-lobes lanceolate, gradually narrowed upwards
 23. *S. biflora* ssp. *biflora*
 28. Disk-lobes suddenly caudate-mucronate from an ovate base
 23a. *S. biflora* ssp. *ferruginea*
 27. No deep pits between the disk-lobes. Nut, when cancellate, with longitudinally elongate lacunae.
 29. Male spikelets at least partly much shorter than their peduncles.
 Nut scrobiculate 24. *S. mikawana*
 29. Male spikelets longer than or as long as their peduncles.
 30. Nut ovoid or ellipsoid.
 31. Nut laterally compressed, very smooth and shining
 25. *S. annularis*
 31. Nut not compressed, not very smooth and shining.
 32. Disk-lobes muticous, or disk not lobed.
 33. Disk not or hardly lobed. Nut smooth or slightly cancellate, dull 26. *S. novae-hollandiae*
 33. Disk distinctly lobed. Nut deeply cancellate, shining 27. *S. parvula*
 32. Disk-lobes mucronulate by a short, stiff point
 28. *S. tricuspidata*

- 30. Nut globose.
 - 34. Disk not cellular-glandular.
 - 35. Nut deeply longitudinally ribbed or scrobiculate
 - 29. *S. laxa*
 - 35. Nut smooth 30. *S. thwaitesiana*
 - 34. Disk cellular-glandular 31. *S. rugosa*
- 26. Nut-bearing spikelets with 2 glumes.
 - 36. Ripe nuts falling out of the glumes which are persistent on the rhachilla
 - Sect. VII. Sphaeropus*
 - 32. *S. pygmaeopsis*
 - 36. Ripe nuts closely enveloped by the glumes and falling with them
 - Sect. VIII. Diplacrum*
 - 37. Glumes of the female spikelets 3-lobed 33. *S. caricina*
 - 37. Glumes of the female spikelets entire 34. *S. reticulata*

Key to the Malaysian Scleriae

In the measurements of the nuts the adhering hypogynous disk is not included

- 1.a. Glumes beset with long, patent hairs 2
- b. Glumes glabrous, sometimes minutely appressed-hairy 4
- 2.a. Nut-bearing spikelets 3—4 mm long. Nut smooth or more or less rugulose, often somewhat tuberculate at the top, glabrous. Spikelets in small, axillary clusters (one cluster terminal) 31. *S. rugosa*
- b. Nut-bearing spikelets much larger, (6—)8—9 mm long. Nut densely tuberculate throughout, stellately hairy on the top of each tubercle. Spikelets in a dense, globose, terminal cluster 1—2 cm across, 1—2 smaller lateral clusters whether or not present 3
- 3.a. Besides the terminal cluster of spikelets 1—2 smaller clusters lower down on the stem in the axil of a leaf-like bract. Disk well developed, patelliform, almost as wide as the nut 20. *S. carphiformis*
- b. No axillary clusters. Disk reduced to a columnar, triquetrous stipe much narrower than the nut 21. *S. necsii*
- 4.a. Inflorescence linear, spiciform, unbranched, with several almost sessile clusters of spikelets, without leafy bracts. Spikelets all bisexual, 2½—3 mm long. Strongly lemon-scented annual 22. *S. pergracilis*
- b. Inflorescence otherwise. Plant not lemon-scented 5
- 5.a. Nut-bearing spikelets with 2 glumes, 1½—3 mm long; male spikelets 1—2 mm long. Spikelets strictly unisexual, in very small, axillary, head-like, subsessile clusters. Disk obsolete 6
- b. Nut-bearing spikelets with at least 3 glumes. Other characters not united 8
- 6.a. Glumes of the female spikelets distinctly 3-lobed, prominently several-nerved. Ripe nut completely hidden by the connivent glumes and falling with them 33. *S. caricina*
- b. Glumes of the female spikelets entire, with only the midnerve more or less prominent 7
- 7.a. Ripe nut completely hidden by the connivent glumes and falling with them, depressed-globose, tuberculate-reticulate between the 3 longitudinal ribs, ¾ mm high, 1—1¼ mm broad. Peduncle of female spikelet not or hardly swollen at the top 34. *S. reticulata*
- b. Ripe nut visible between the more or less spreading glumes, falling out of them, globose, longitudinally costulate with 3 more prominent ribs, ⅜—⅝ mm long and wide. Glumes persistent on the rhachilla. Peduncle of female spikelet bulbously swollen and spongy at the top 32. *S. pygmaeopsis*
- 8.a. Middle leaves of the flowering stems clustered in groups of (2—)3(—5), thus forming pseudo-whorls. Commonly stout perennials with decompound inflorescences consisting of several partial panicles 9
- b. Leaves not in pseudo-whorls 13
- 9.a. Disk cyathiform, covering at least the lower half of the nut, halfway or less 3-lobed, the lobes broadened upwards, contiguous or overlapping, truncate or very obtuse,

- crenulate at the top, at first yellow, ultimately dark red. Nut small, 2 mm diam., olivaceous brown to greyish black 14. *S. sumatrensis*
- b. Disk much smaller, not cyathiform, its lobes narrowed upwards, separated from each other, entire or denticulate at the top 10
- 10.a. Nut strongly depressed, small, $1\frac{1}{2}$ mm high, 2—2½ mm broad, not or hardly mucronate 16a. *S. scrobiculata* ssp. *discocarpa*
- b. Nut not depressed, ovoid or globose, 2—3 mm high 11
- 11.a. Branches of the narrow partial panicles obliquely erect. Ultimate bractlets inconspicuous, much shorter than the branchlets in their axils. Nut-bearing spikelets rather evenly distributed throughout the partial panicles, rounded at the base. Nut slightly rugulose to smooth, hardly or not mucronate, often tinged with blue. Disk at first yellow, ultimately reddish. Stems and upper side of the leaves often asperous 15. *S. polycarpa*
- b. Branches of the broad partial panicles spreading. Ultimate bractlets conspicuous, about as long as to much longer than the branchlets in their axils. Nut-bearing spikelets chiefly restricted to the base of the branches of the partial panicles. Nut mucronate, white or discoloured, scrobiculate or cancellate, very rarely smooth 12
- 12.a. Nut cancellate, at first whitish, soon discoloured (dingy purple to blackish), 2—2½ mm long. Nut-bearing spikelets cuneate at the base. Leaf-sheaths wingless. Underside of leaves often more or less pubescent with long, white hairs 17. *S. purpurascens*
- b. Nut scrobiculate (very rarely smooth), white, $2\frac{1}{2}$ —3 mm long. Nut-bearing spikelets rounded at the base. Leaf-sheaths wingless to broadly winged. Leaves glabrous 16. *S. scrobiculata*
- 13.a. (8). Disk-lobes mucronulate by a short (easily overlooked!), erect, stiff point 14
- b. Disk-lobes not mucronulate, or disk obsolete 16
- 14.a. Nut exactly globose or slightly depressed, strikingly cancellate, densely ferrugineous-pubescent on the walls between the lacunae, with dark purplish to blackish beak and 2 basal, deep pits in each sinus of the disk-lobes 23a. *S. biflora* ssp. *ferruginea*
- b. Nut ovoid, rugulose or obscurely cancellate, beakless or with white beak, sparsely pubescent or glabrous, without basal pits 15
- 15.a. Nut distinctly beaked, somewhat tuberculate at the top. Annual 28. *S. tricuspidata*
- b. Nut not beaked, not tuberculate. Perennial 7. *S. benthamii*
- 16.a. Disk distinctly cup-shaped, reaching to about half the height of the nut, shortly 3-lobed, thin, yellowish or rufidulous. Nut obtusely but distinctly trigonous, hardly umbonulate, hirtellous with ferrugineous hairs 5. *S. cyathophora*
- b. Disk shorter, sometimes obsolete, when attaining half the height of the nut not cup-shaped 17
- 17.a. Disk-lobes very broad (broader than long), membranous, white, truncate, erect or spreading upwards, the disk looking like a stand-up collar under the nut 18
- b. Disk-lobes otherwise, or disk obsolete 19
- 18.a. Leaves crowded at the base of the flowering stems, and moreover 1—2 distant higher up, 5—10 mm wide. Stems 100—150 cm by 2—3 mm, the base clothed with the fibrous remains of decayed leaf-sheaths. Inflorescence 30—60 cm long. Spikelets 3—3½ mm long. Beak of nut white 3. *S. papuana*
- b. All leaves about equally distributed along the stems, 2—3 mm wide. Stems 20—60 cm by 1—1½ mm; no fibrous remains of decayed leaf-sheaths. Inflorescence 3—12 cm long. Spikelets 4—6 mm long. Beak of nut brown or blackish 4. *S. brownii*
- 19.a. Nut with 3 basal depressions which are rugulose by transverse, wavy, ferrugineous ridges, trigonous. Disk reduced to a narrow, brown band concrete with the nut. Inflorescence very loose, with spiciform branches 20
- b. Nut without or with smooth basal depressions. Other characters not united 21
- 20.a. Nut smooth except for the rugulose depressions at the base 19. *S. lithosperma* var. *lithosperma*
- b. Nut rugulose throughout 19a. *S. lithosperma* var. *linearis*
- 21.a. Annuals with fibrous, red roots. Usually small plants 22
- b. Perennials with distinct, woody, often nodose rhizomes. Usually stout plants 31
- 22.a. Nut ferrugineous-pubescent on the walls between the lacunae of the deeply cancellate nut 23
- b. Nut glabrous 25
- 23.a. Nut ellipsoid, with white beak, not deeply pitted at the base, the lacunae mostly

- longitudinally elongate. Disk-lobes ovate, acute 27. *S. parvula*
- b. Nut exactly globose or somewhat depressed-globose, with purplish to blackish beak and 2 basal, deep pits clearly visible in each sinus of the disk-lobes, the lacunae on the surface of the nut at least for the greater part square to broader than long 24
- 24.a. Leaves weak, 3—4 mm wide. Disk-lobes lanceolate, gradually narrowed upwards, very acute, reaching to half the height of the nut 23. *S. biflora* ssp. *biflora*
- b. Leaves rigid, 1—2 mm wide. Disk-lobes suddenly caudate-mucronate from an ovate base, shorter, reaching to about $\frac{1}{2}$ height of the nut 23a. *S. biflora* ssp. *ferruginea*
- 25.a. Stems retrorsely scabrid on the angles. Nut very smooth and shining, ovoid, more or less laterally compressed, not apiculate. Disk not lobed 25. *S. annularis*
- b. Stems smooth (in *S. mikawana* rarely somewhat scabrid at the top). Nut not compressed 26
- 26.a. Male spikelets at least partly much shorter than their peduncles, which are often reddish and recurved. Nut globose or ovoid-globose, minutely umbonulate, scrobiculate (the walls between the lacunae broad, forming a more or less continuous surface interrupted by the pits). Disk 3-lobed, with oblong lobes 24. *S. mikawana*
- b. Male spikelets longer than or as long as their peduncles. Nut variously sculptured or smooth 27
- 27.a. Disk-lobes ovate, acute. Nut prominently cancellate 27. *S. parvula*
- b. Disk-lobes semi-orbicular, rounded, or disk hardly lobed 28
- 28.a. Nut ellipsoid or oblong-ellipsoid, with nearly parallel sides, dull, white, $2\frac{1}{4}$ — $2\frac{3}{4}$ mm long. Disk hardly lobed, triangular with rounded angles. Cupula (and its scar in the centre of the disk) deeply 3-lobed 26. *S. novae-hollandiae*
- b. Nut globose, shining, $1\frac{1}{2}$ — $1\frac{1}{8}$ mm across. Cupula not lobed 29
- 29.a. Disk densely cellular-glandular. Peduncles of the partial inflorescences relatively stout 31. *S. rugosa*
- b. Disk not cellular-glandular. Peduncles of the partial inflorescences slender, filiform 30
- 30.a. Nut deeply longitudinally ribbed or scrobiculate 29. *S. laxa*
- b. Nut smooth 30. *S. thwaitesiana*
- 31.a. (21). Inflorescence a single, terminal, much branched, long-peduncled panicle with a short, setaceous bract at the base, or ebracteate, very rarely a lateral panicle in the axil of a leafy bract added. Spikelets not clustered, solitary along the numerous spiciform branches of the panicle 13. *S. poaeformis*
- b. One or more lateral panicles in the axils of leafy bracts present. Spikelets in clusters of 2—4 32
- 32.a. Disk-lobes lanceolate, thin, often bidentate at the apex. Leaf-sheaths at least partly winged. Nut globose or nearly so, pubescent if not too old 6. *S. levis*
- b. Disk-lobes broadly rounded, or disk obsolete 33
- 33.a. Contraligule with a lanceolate or oblong, 1— $1\frac{1}{2}$ cm long, scarious appendage. Secondary bracts stiff, long-exserted from the panicle 10. *S. ciliaris*
- b. Contraligule short, either without a scarious appendage or with a band-like appendage much broader than long 34
- 34.a. Nut depressed-globose, not or hardly umbonulate. Disk-lobes broadly ovate. Leaf-sheaths wingless 8. *S. oblata*
- b. Nut not depressed 35
- 35.a. Nut 3— $3\frac{1}{2}$ mm long (beak, if any, included) 36
- b. Nut about 2 mm long 40
- 36.a. Nut rostrate by a cylindrical or narrowly conical beak up to $1\frac{1}{2}$ mm long, prominently trigonous, covered with weak, brownish, long hairs. Spikelets all alike, bisexual (with several male flowers besides the single female one) 1a. *S. motleyi* ssp. *rostrata*
- b. Nut erostrate, muticous or shortly mucronate or umbonate. Besides the female or bisexual spikelets strictly male ones present 37
- 37.a. Inflorescence ample, but very open, the ultimate branches spiciform, with distant, 1—2 cm spaced clusters of spikelets. Disk narrow, triangular, each side bordered by a low but distinct swelling of the pericarp. Nut much exserted from the glumes, very smooth and shining, muticous 12. *S. junghuhniana*
- b. Branches of the more or less dense inflorescence not spiciform, the clusters of spikelets not so strikingly spaced. Pericarp not swollen around the disk 38
- 38.a. Disk obsolete, reduced to a narrow, triangular, minutely glandular band concrete with the nut. Nut with 3 shallow depressions at the base, smooth, acute or minutely

- umbonulate. Nut-bearing spikelets bisexual, with some to several male flowers besides the female one. Inflorescence usually copious, with several corymbiform partial panicles. Leaf-sheaths wingless 18. *S. corymbosa*
- b. Disk well developed. Nut not depressed at the base. Nut-bearing spikelets as a rule strictly female, rarely with a single male flower besides the female one 39
- 39.a. Nut large, usually more than 3 mm long, ovoid or broadly ovoid, obtuse, mucous, very smooth and shining. Contraligule with cartilaginous, incrassate margin, not appendaged. Leaf-sheaths winged 11. *S. psilorrhiza*
- b. Nut at most 3 mm long, ovoid or subglobose, smooth or cancellate, umbonate or mucronate. Contraligule with scarious, brown, band-like appendage. Leaf-sheaths winged or wingless 9. *S. terrestris*
- 40.a. (35). Spikelets all bisexual, with some to several male flowers besides the female one. Nut prominently trigonous, conical with flat sides, covered with weak, appressed, long, brown hairs. Disk thick, reflexed, not lobed, about as wide as the base of the nut 1. *S. motleyi*
- b. Strictly male spikelets present. Nut ovoid or globose, obtusely trigonous or terete, glabrous or shortly hairy 41
- 41.a. Leaves crowded at the base of the flowering stem, moreover 1—3 distant higher up. Base of the stems clothed with the fibrous remains of decayed leaf-sheaths. Spikelets bisexual and male. Mouth of the leaf-sheaths truncate or emarginate, sometimes slightly convex. Nut obtusely trigonous, smooth, covered with stellately arranged, short, white hairs 2. *S. densispicata*
- b. Leaves about equally distributed along the flowering stems. No fibrous remains of decayed leaf-sheaths. Spikelets unisexual (female and male). Mouth of the leaf-sheaths with a short but distinct contraligule bordered by a brown, scarious appendage. Nut terete to obtusely trigonous, smooth to cancellate, often minutely hairy when young 9. *S. terrestris*

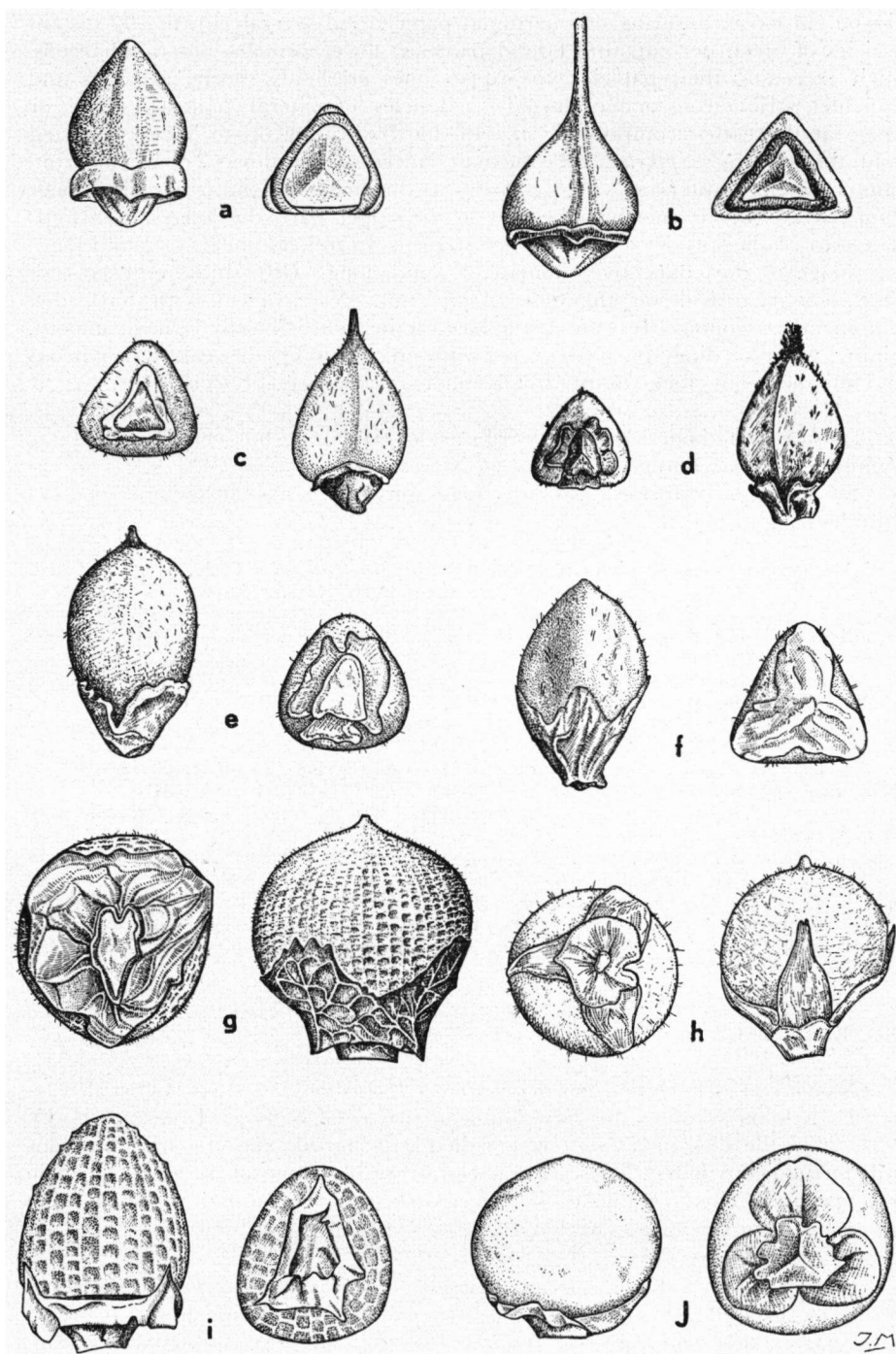
Sect. I. *Browniae* (Clarke) Kern, stat. nov. — *Scleria subgen. Browniae* ('*Browneae*') Clarke, Kew Bull., add. ser. 8, 1908, 132 (type species: *Scleria brownii* Kunth).

1. *Scleria motleyi* C. B. Clarke, Philip. J. Sc. 2, 1907, Bot. 104; Ill. Cyp. 1909, t. 126, f. 1—7; Merr., En. Born. 1921, 66; En. Philip. 1, 1923, 134, excl. var. *densispicata* Clarke; ? Ohwi, Bot. Mag. Tokyo 56, 1942, 213. [T.: Borneo: *Motley* 72, 74, 152 (K)]. — *S. trigonocarpa* Ridl. [J. Str. Br. R. As. Soc. no 46, 1906, 228, nom. nud.]; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 110, non Steud. (1855). [T.: Pahang: *Ridley s.n.* (SING)]. — *S. gonocarpa* Ridl., Fl. Mal. Pen. 5, 1925, 177. Based on *S. trigonocarpa* Ridl.

ssp. *motleyi* — Synonymy as above. — Fig. 3a.

Perennial with short, woody rhizome. Stems tufted, rather stout, erect, triquetrous, glabrous and smooth, often quite or almost hidden by the overlapping leaf-sheaths, (30—)60—100 cm by 2—5 mm. Leaves numerous, cauline, chartaceous, very gradually narrowed to the long, very slender, scabrous tip, glabrous or shortly pubescent, sometimes asperous on the upper side, somewhat rugulose when dry, greyish green, 5—15 mm wide; sheaths loose, triquetrous, not winged, stramineous or purplish at the base, glabrous or pubescent, the mouth emarginate on the ventral side, ciliate. Inflorescence narrow, elongate,

Fig. 3. Nuts and disks of: a. *Scleria motleyi* Clarke ssp. *motleyi*; b. *S. motleyi* Clarke ssp. *rostrata* Kern; c. *S. densispicata* (Clarke) Kern; d. *S. papuana* Kern; e. *S. brownii* Kunth; f. *S. cyathophora* Holtt.; g. *S. alta* Boeck; h. *S. levis* Retz.; i. *S. benthamii* Clarke; j. *S. oblata* S. T. Blake. — All $\times 10$.



15—60 cm long, consisting of a terminal panicle and several (up to 10) distant fascicles of erect, decompound lateral panicles; lower primary bracts foliaceous, much exceeding their panicles, the upper ones gradually shorter; rachis and branchlets triquetrous, ciliate-hispid; peduncles of lateral panicles single or binate at the nodes, compressed, smooth, hardly (rarely up to 5 cm) exerted from the sheaths. *Spikelets* all bisexual, lanceolate in flower, ovate in fruit, solitary or in clusters of 2—3, shortly peduncled, brown, 3—4 mm long; *glumes* ovate, acute, shortly pubescent in the upper part, the longest c. 3 mm; male part of the spikelet c. 3 mm long; stamens 3; anthers linear, c. 2 mm long; appendage of the connective subulate, $\frac{1}{3}$ mm long. *Disk* thick, reflexed, not lobed, about as wide as the base of the nut. *Nut* conical with flat sides, prominently trigonous, truncate at the base, acute, not or hardly beaked, smooth, shining, white or dingy purple, covered with erect, appressed, weak, ferrugineous or cinnamonaceous long hairs, finally more or less glabrescent, $1\frac{1}{2}$ — $1\frac{2}{3}$ mm.

Distribution: Widely distributed in Malaysia, but very local: Malay Peninsula, Banka, Borneo, Philippines, New Guinea.

Ecology: In forests, on sandy ridges, on river banks, at low and medium altitudes (up to 900 m).

MALAY PENINSULA. Pahang, Sungei Raub: *Machado 11533* (K, SING); Tahan River: *Ridley 2147* (K), *s.n.* (SING); Kemaman, Bukit Kajang: *Corner SF 30213* (L, SING).

BANKA. Lobok Besar: *Anta 441* (BO, K, L, SING); Pangkalpinang, G. Mangkol: *Bünneimeijer 2139* (BO, L).

BORNEO. Sarawak. Baram: *Hewitt 92* (BO, K, SAR). Brunei, junction of Temburong and Belalang R.: *Jacobs 5644* (L). S. and E. Borneo. Banjarmasin: *Motley 72, 74* (K), *152* (CGE, K); W. Kutei: *Endert 3176* (BO, L); Nunukan: *Kostermans 9140* (BO, K, L), *Meijer 1918* (BO, K, L); E. Kutei: *Kostermans 6083* (K, L), *6653* (L); Balikpapan: *Rutten 4* (U). North Borneo. Kudat: *Fraser 107* (K), *Hose 99* (SING); Balambangan: *Kloss SF 19270* (BO, K, NY, SING); Gaya: *Ridley 9104* (K, SING); Sandakan: *Clemens 9523* (BO); *Creagh s.n.* (K); *Ramos 1129* (BO, P); Mt Kinabalu: *Clemens 27303* (BM, BO, K, L, NY); Distr. Ranau, Bukit Aitaidon: *Meijer SAN 20706* (L).

PHILIPPINES. Palawan: *Merrill 9620* (BM, BO, K, L, NY, P, SING), *11582* (BO, L, P). Negros. Kinabkabau R.: *Edaño PNH 21910* (L). Panay. Capiz Prov., Libacao: *Martelino & Edaño BS 35496* (BM, BO, K, L, P). Basilan Islands. Isabela: *Santos 4116* (L). Mindanao. Davao Prov., Mt Galintan: *Ramos & Edaño BS 48887* (NY).

CELEBES. Kendari: *Kjellberg 432* (BO).

NEW GUINEA. W. New Guinea. Albatros bivouac: *Docters van Leeuwen 11200* (BO, K, L, SING); Both R.: *van Royen 4728* (L).

Notes. 1. I have not seen *Kanehira & Hatusima 13075* (cf. Ohwi, 1942).

2. In Blake's key to the New Guinean species of *Scleria* (J. Arn. Arb. 35, 1954, 232) the disk in *S. motleyi* is called cup-shaped, and the nut hirtellous with ferrugineous hairs. These characters are rather those of *S. papuana*. The only specimen cited by Blake is *Brass 8870* from Hollandia, which I have not seen.

1a. *ssp. rostrata* Kern, subspec. nov. [T.: Luzon: *Ramos & Edaño BS 34110* (L; dupl. in BO, NY, SING)]. — *S. trigona* Merr., Philip. J. Sc. 8, 1913, Bot. 363, ex descr. [T.: Leyte: *Wenzel 158* (n.v.)]. — *S. sorsogonensis* Elm.

ex Merr., En. Philip. 1, 1923, 134, in syn.; Elm., Leaf. Philip. Bot. 10, 1938, 3541, descr. angl. [T.: Luzon: *Elmer 15411* (BM, BO, C, FI, K, L, NY, U)]. — *S. subrostrata* Elm., Leaf. Philip. Bot. 10, 1938, 3542, in syn. — *Fig. 3b*.

Spiculae maturitate lanceolatae, 5–6 mm longae. Glumae lanceolatae, acuminatae, acutissimae vel mucronatae, sparse pilosae vel fere glabrae, purpureae, usque ad $4\frac{1}{2}$ mm longae. Spicularum pars mascula $4\frac{1}{2}$ mm longa. Nux rostrata, rostro usque ad $1\frac{1}{2}$ mm longa. Antherae $2\frac{1}{2}$ mm longae, connectivo in appendicem ovatam producto. Inflorescentiae foliorumque vaginae plerumque purpureae.

PHILIPPINES. Babuyan. Camiguin Island, Mt Mapolapola: *Edaño BS 79372* (NY). Luzon. Isabela Prov., San Mariano: *Ramos & Edaño BS 46905* (NY, SING); Prov. of Nueva Vizcaya, Dupax: *MacGregor BS 14230* (BM, K, P); Prov. of Pangasinan, Mt San Isidro, Labrador: *Fénix BS 29896* (P); Zambales Prov., Mt Tapolao: *Ramos & Edaño BS 44761* (NY); Bulacan Prov., Angat: *Ramos & Edaño BS 34110* (BO, L, NY, SING); Prov. of Rizal, Mt Lumutan: *Ramos & Edaño BS 29706* (K, NY, P, SING); Prov. of Tayabas, Mt Cadig: *Yates BS 25500* (BO, NY, P), *BS 25552* (P); Camarines Prov., Paracale: *Ramos & Edaño BS 33583* (BO, L); Prov. of Sorsogon, Mt Bulusan: *Elmer 15411* (BM, BO, C, FI, K, L, NY, P, U); Apayao Subprov., Mt Magnos: *Edaño PNH 19768* (L). Catanduanes: *Ramos BS 30426* (BO, NY, P). Biliran Island. Mt Suio: *Sulit PNH 21580* (L).

Notes. 1. Typical specimens of this endemic of Luzon and adjacent islands make the impression of a separate species. As especially the length of the beak of the nut varies considerably, I prefer to treat it as a geographical race (subspecies) of the much more widely distributed *Scleria motleyi*.

2. I have not seen *Wenzel 158*, the type collection of *Scleria trigona* Merr.; to judge from the description it represents a state of *ssp. rostrata* with less pronounced beak of the nut.

2. *Scleria densispicata* (C. B. Clarke) Kern, stat. nov. Based on *S. motleyi* var. *densi-spicata* C. B. Clarke. — *S. motleyi* C. B. Clarke var. *densi-spicata* C. B. Clarke, Philip. J. Sc. 2, 1907, Bot. 104; Merr., En. Philip. 1, 1923, 134. [T.: Luzon: *Loher 803* (K)]. — *Fig. 3c*.

Perennial with short, woody rhizome. Stems tufted, slender, erect, triquetrous, glabrous and smooth, naked in the lower part, 30–100 cm by 1–3 mm, the base densely covered with the decayed, finally fibrous, dull brown remains of old leaf-sheaths. Leaves numerous, in a basal rosette and moreover 1–3 distant on the stem (their sheaths not overlapping), chartaceous, very gradually narrowed to the long, setaceous tip, glabrous or slightly pubescent, scabrid on the margins, shining, 5–7 mm wide; sheaths of the stem-leaves and bracts narrow, triquetrous, not winged, stramineous, glabrous, the mouth truncate or emarginate, ciliate, sometimes somewhat convex. Inflorescence narrow, elongate, 15–40 cm long, consisting of a terminal panicle and several (up to 5) distant fascicles of erect, compound lateral panicles; lower primary bracts foliaceous, much exceeding their panicles, the upper ones gradually shorter; secondary bracts setaceous, long and standing out from the panicles; branchlets triquetrous, ciliate-hispid; peduncles of lateral panicles solitary or binate at the nodes, compressed, scabrid, 0–5 cm exerted from the sheaths. Spikelets male and bisexual, in dense clusters of (3–)5–7, sessile or almost so, brown, the male ones lanceolate, 4–5 mm long, the bisexual ones ovate in fruit, $3\frac{1}{2}$ – $4\frac{1}{2}$ mm long, the male part 3–4 mm; glumes ovate, acute, sparsely hairy; stamens 3;

anthers linear, c. 2 mm long; appendage of the connective subulate, $\frac{2}{3}$ mm long, smooth or somewhat scabrid. Cupula urceolate, with brown margin, thick, spongy. Disk thin, reflexed, not lobed, narrower than the base of the nut. Nut ovoid, with somewhat convex sides, obtusely trigonous, rounded at the base, acuminate, shortly beaked (beak c. $\frac{1}{3}$ mm long), smooth, white or finally discoloured, covered with bundles of patent, stiff, whitish, short hairs, finally more or less glabrescent, c. 2 by $1\frac{1}{3}$ — $1\frac{1}{2}$ mm.

Distribution: Only known from Luzon.

Ecology: In forests at low and medium altitudes, ascending to 800 m.

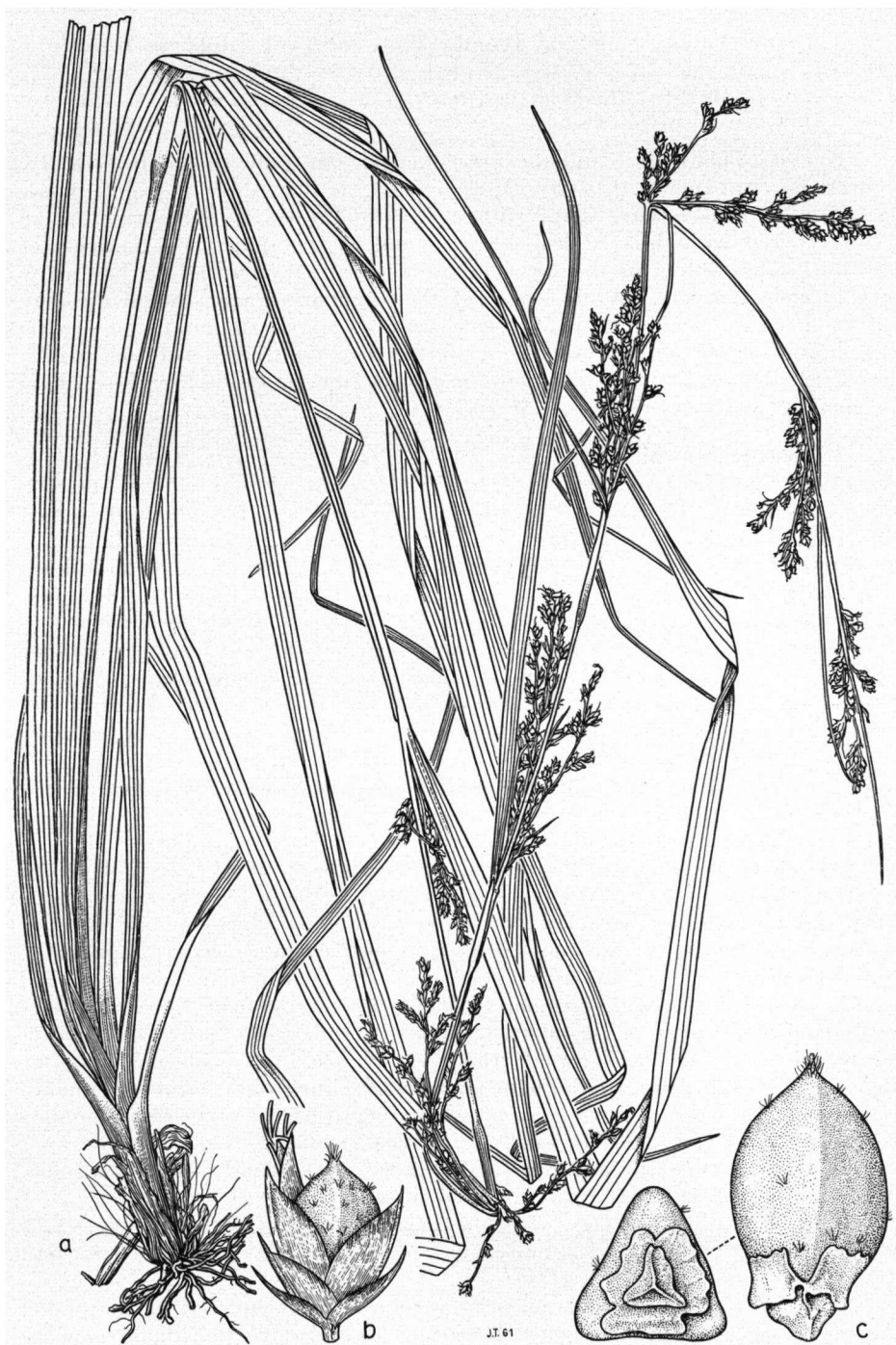
PHILIPPINES. Luzon. Prov. of Pampanga, Mt Arayat: *Loher* 803 (K); *Ramos* BS 22441 (K, L, NY, P); Ilocos Norte Prov., Burgos: *Ramos* BS 32845 (BO, L, P); Zambales Prov., Mt Tapalao: *Ramos & Edaña* BS 44754 (BO, NY, SING). According to Merrill, En. Philip. 1, 1923, 134, also in Prov. of Nueva Vizcaya.

Note. Clarke distinguished this taxon by the dense inflorescences with long, setaceous secondary bracts standing out from the panicles. In my opinion it certainly deserves specific rank, as the shape and the indument of the nut are also very different from those in *Scleria motleyi*.

3. *Scleria papuana* Kern, sp. nov. — ? *Scleria motleyi* (non Clarke) S. T. Blake, J. Arn. Arb. 35, 1954, 225. — Fig. 3d, 4.

Herba perennis, sat valida, 1— $1\frac{1}{2}$ m alta. Rhizoma lignosum, breve. Culmi fasciculati, erecti vel oblique erecti, acute triquetri, faciebus plani, glabri vel sparse pilosi, laeves, distanter foliigeri, 2—3 mm crassi, basi vaginis brunneis demum in fibras dissolutis obtecti. Folia basalia numerosa, glaucescentia, chartacea, plana vel in sicco marginibus revoluta, glabra vel subtus minute pubescentia, 5—10 mm lata, marginibus antrorse scabridis; folia caulina 1—2, laminis brevioribus, vaginis arctis, acute triquetris, exalatis, laevibus, purpureis, antice plus minusve pubescentibus, 3—4 cm longis, ore truncatis vel leviter convexis vel concavis, ciliolatis. Inflorescentia angusta, elongata, laxa, 30—60 cm longa, e paniculis pluribus (usque ad 7), distantibus, stricte erectis, oblongis, compositis constructa, pedunculis solitariis vel binatis e bractearum vaginis vix exsertis, ramis triquetris laevibus vel scabridis; bractee primariae inferiores foliis caulinis similes, elongatae, usque ad 45 cm longae, superiores gradatim breviores; bractee secundariae inconspicuae, setaceae. Spiculae bisexuales praevalidae, spiculis nonnullis masculis (semper?) intermixtis, solitariae vel 2—3 aggregatae, sessiles vel breviter pedunculatae, maturitate ovatae, brunneae, 3— $3\frac{1}{2}$ mm longae; glumae partis femineae 4—6, chartaceae, ovatae, acutae, ciliolatae, dorso minute pubescentes vel subglabrae; pars mascula pluriflora, glumis membranaceis, lanceolatis; stamina 3, antheris linearibus c. $1\frac{1}{2}$ mm longis, connectivo in appendicem $\frac{1}{3}$ mm longam scabram producto. Cupula patelliformis. Discus membranaceus, erectus, niveus, nuce angustior, distincte trilobatus, lobis latis obtusissimis undulatis. Nux ovoidea, obtuse trigona, lateribus paullo convexis, basi rotundata, apiculata, laevis, nitida, lactea, demum sordida, fasciculis sparsis pilorum breviorum albidorum vel ferrugineorum obsita, demum plus minusve glabrescens, 2 mm longa, $1\frac{1}{3}$ — $1\frac{2}{3}$ mm lata.

Fig. 4. *Scleria papuana* Kern — a. Habit, $\times \frac{1}{2}$; b. spikelet, $\times 7\frac{1}{2}$; c. nut, $\times 15$. — From Brass 26047.



Typus: Papua, Fergusson Islands: *Brass* 26047 (L; dupl. in K).

NEW GUINEA. W. New Guinea. Rouffaer River, riverbank, 250 m: *Docters van Leeuwen* 10246 (BO, L); Humboldt Bay, forest glades, 10 m: *Gjellerup* 982 (BO, L). Papua. Fergusson Island, secondary rain-forest, 150 m: *Brass* 26047 (K, L).

Note. This species and the preceding one are only known from a few collections. Apparently they are closely related, as they agree in habit (many leaves in a basal rosette, stems with a few distant leaves only, base of the plant covered with decayed leaf-sheaths), and in the shape and hairiness of the nut. They differ in the distribution of sexes (*S. densispicata* has many strictly male spikelets), in the length of the secondary bracts, and in the very dissimilar disk under the nut, characters estimated as very important for specific delimitation in the genus. For this reason the two are treated here on specific level; possibly additional collections may show the necessity to regard them as geographical races of one single species.

4. *Scleria brownii* Kunth, En. 2, 1837, 349 ('*brownei*'); Steud., Syn. 2, 1855, 173; Boeck., Linnaea 38, 1874, 453; F. v. M., Fragm. Phyt. Austr. 9, 1875, 21; Benth., Fl. Austr. 7, 1878, 429; Domin, Bibl. Bot., Heft 85, 1915, 487, incl. varr.; Kük., Bot. Jahrb. 70, 1940, 464. Based on *S. distans* R. Br. — *S. distans* R. Br., Prodr. 1810, 240, non Poir. (1806). [T.: Littora N. Holl. intra tropicum: *R. Brown* 6070 (BM)]. — *S. pallidiflora* Boeck., Flora 58, 1875, 119. [T.: Queensland, Gladstone: *Am. Dietrich* 724 (HBG)]. — *Fig. 3e.*

Perennial with short, nodose, fuscous rhizome. *Stems* slender, tufted or approximate on the shortly creeping rhizome, erect, triquetrous, retrorsely hispid-scabrid on the angles to almost smooth, 20–60 cm by 1–1½ mm. *Leaves* rigid, narrowly linear, canaliculate, with revolute margins, acute, glabrous, more or less scabrid on the margins, 2–3 mm wide; sheaths narrow, not winged, often more or less pubescent, the lower ones purplish; contraligule absent (mouth of the sheaths truncate or almost so, villous). *Inflorescence* narrow, consisting of 2–4 distant to approximate, small, shortly peduncled clusters, 3–12 cm long; peduncles single or binate at the nodes; primary bracts foliaceous, erect, similar to the leaves, as long as or overtopping the inflorescence, the upper ones gradually shorter; secondary bracts inconspicuous. *Spikelets* bisexual and male (see note), 4–6 mm long; male spikelets several-flowered; stamens 3; anthers linear, 2–2½ mm long; appendage of the connective oblong-ovate, smooth or slightly scabrid; bisexual spikelets with several male flowers; glumes ovate-lanceolate, acute or cuspidate, ferrugineous with green keel. *Disk* 3-lobed, whitish; lobes membranous, broad, truncate, undulate. *Nut* small, much shorter than the glumes, fragile, globular to ovoid-ellipsoid, obtusely or obscurely trigonous, apiculate (the short beak conical, brown or blackish), more or less granular-tuberculate, at first pubescent, finally glabrescent, white, 2–3 by 1½ mm.

Distribution: Australia (N. Territory, Queensland), New Caledonia, Tonga; in Malaysia a few times collected in New Guinea.

NEW GUINEA. W. New Guinea. Humboldt Bay: *Beccari s.n.* (FI). NE. New Guinea. Kalasa, mission hill, hole in rock, 1600 ft: *Clemens* 7903 (B). Papua. Kamosia, open savannah land, 50 ft: *Carr* 11181 (BM, L, NY, SING).

Notes. 1. The bisexual spikelets are mostly prevalent, but in one of the Australian specimens in the Leyden Herbarium I found only strictly male spikelets. Is there a tendency to dioecism in this species?

2. *Scleria mackaviensis* Boeck., Flora 58, 1875, 119; Clarke, Ill. Cyp. t. 125, f. 3—5; Domin, Bibl. Bot., Heft 85, 1915, 488 [T.: *Am. Dietrich 720* (HBG)], is very near to *S. brownii* and possibly not specifically distinct. It differs by the presence of an up to 5 mm long, tongue-shaped contraligule and the longer, more cylindrical, often curved, white (not brown) beak of the nut, and is usually somewhat stouter, with broader leaves. In the few Australian and New-Caledonian collections I have referred to *S. mackaviensis*, these characters are not always as pronounced as in the type-collection; therefore it seems doubtful whether a line can be drawn between *S. brownii* and *S. mackaviensis*. In specimens from Tonga (*Yuncker 15849*) the nuts are perfectly smooth and the contraligule short.

The specimens of *Am. Dietrich 725* (BM, HBG), labelled "*Scleria novae-hollandiae*, O. Boeckeler det." (not in Boeckeler's handwriting) belong to *S. mackaviensis*.

3. *Scleria neocaledonica* Rendle, J. Linn. Soc., Bot. 45, 1921, 262, is also near to *S. brownii*. I have only seen a few poor specimens which might answer Rendle's description. They are much stouter than *S. brownii*, with broad, more or less hairy leaves, somewhat larger spikelets, the nut rather densely covered with brown hairs, the beak of the nut densely hairy, and are moreover remarkable by the numerous, long, brown sheaths surrounding the base of the stems.

Scleria tryonii Domin, Bibl. Bot., Heft 85, 1915, 487, seems to be very near to *S. neocaledonica*, if not conspecific with it. Rendle describes the hypogynous disk of *S. neocaledonica* as being entire, Domin that of *S. tryonii* as being 3-lobed.

4. The specimen in the Hamburg Herbarium of *Dietrich 724*, "*Nova Holl. Queensland, Gladstone*", annotated by Boeckeler "*Scleria pallidiflora n. sp.*" is certainly conspecific with the type of *Scleria brownii*.

5. *Scleria cyathophora* Holtt., Gard. Bull. Sing. 11, 1947, 294. [T.: Malay Peninsula: *Henderson SF 24042* (SING; dupl. in BO, K)]. — *Fig. 3f.*

Perennial with shortly creeping, woody, nodose rhizome clothed with brown scales. *Stems* very slender, erect, triquetrous, glabrous and smooth, leafy throughout, up to 100 cm by 2—3 mm. *Leaves* rigid, flat or canaliculate, with revolute margins when dry, very gradually narrowed to the acute tip, glabrous, smooth except for the retrorsely scaberulous tip, greyish green, 3—4 mm wide; sheaths narrow, triquetrous, not winged, puberulous; contraligule very short, broader than long, rounded, hairy. *Inflorescence* narrow, 5—15 cm long, consisting of a terminal panicle and about 3 short, erect lateral ones, the latter single or binate at the nodes, erect, 2—3 cm long, with very short branches; peduncles not or but slightly exerted from the sheaths; primary bracts similar to the leaves, the lowest one overtopping the inflorescence; secondary bracts subulate. *Spikelets* bisexual or female, and male, reddish brown, shortly peduncled, 3—3½ mm long; male spikelets lanceolate; stamens 3 (or in some flowers 2); anthers c. 2 mm, with conical-subulate, scabrid appendage of the connective; nut-bearing spikelets ovoid, with a sterile or male flower besides the terminal female one; glumes ovate, acute, minutely pubescent. *Disk* cyathiform, thin, 3-lobed, about ½ the length of the nut, yellowish or rufidulous; lobes appressed, ovate-triangular, plicate, irregularly denticulate. *Nut* small, ovoid-conical, obtusely but

distinctly trigonous, somewhat acuminate, slightly rugulose, white, hirtellous with ferrugineous hairs, c. 2 by 1½ mm.

Distribution: Only known from a few localities in W. Malaysia, probably often overlooked.

ARCH. IND. Without exact locality: *Waitz s.n.* (L).

BANKA. Lobok Besar, marsh with *Melaleuca*, 5 m: *Kostermans & Anta 374* (BO, L).

MALAY PENINSULA. Pahang. Tasek Bera, in shallow water, low: *Henderson SF 24042* (BO, K, SING).

W. BORNEO. Andjongan, N of Pontianak, along road, sandy soil, among *Sphagnum*: *Polak 683* (BO, K, L).

Notes. 1. Holtum placed *Scleria cyathophora* next to *S. motleyi*, obviously because of its trigonous nuts, and I have followed him by placing the two species in the same section. Indeed, *S. cyathophora* has several characters in common with the group to which *S. motleyi* belongs, especially with *S. papuana*. However, in the other species of this group the spikelets are either all bisexual or the nut-bearing ones have a well-developed, several-flowered male part, whereas in *S. cyathophora* this part is reduced to a single male or frequently sterile flower. Also the resemblance in habit to the other species is rather slight.

2. *Scleria alta* Boeck., *Linnaea* 38, 1874, 485 (fig. 3g), from Khasia, is apparently a near ally of *S. cyathophora*. The structure of the spikelets is the same, the hypogynous disks strikingly similar, and the habit of *S. alta* greatly approaches that of *S. cyathophora*. *Scleria alta* can easily be distinguished by the winged middle leaf-sheaths (wings denticulate-scabrous), the very long secondary bracts, the larger, globose, slightly depressed, cancellate nuts, and by the peculiar contraligule, which is bordered by a broad, chartaceous, yellowish, glabrous appendage.

3. For *S. alta* (non Boeck.) Camus, *Fl. Gén. I.-C.* 7, 1912, 166, see *S. psilorrhiza*, p. 176.

Sect. II. Scleria (type species *Scleria flagellum-nigrorum* Berg., type species of the genus). — *Scleria* sect. *Scleria* Endl., *Gen. Plant.* 1836, 112, p.p. — *Scleria* subgen. *Scleria* Clarke in Hook. f., *Fl. Br. Ind.* 6, 1894, 686, p.p. — *Scleria* subgen. *Euscleria* Clarke in Thiselt.-Dyer, *Fl. Cap.* 8, 1898, 294; Kew Bull., add. ser. 8, 1908, 133; Cherm. in Humbert, *Fl. Madag.*, fam. 29, 1937, 254, p.p. — *Scleria* sect. *Paniculatae* Boeck. ex Pax in E. & P., *Pfl. Fam.* II, 2, 1888, 121, p.p.; Dalla Torre & Harms, *Gen. Siph.* 1900, 35. — *Scleria* sect. *Elatæ* Clarke in Hook. f., *Fl. Br. Ind.* 6, 1894, 689; Cherm. in Humbert, *Fl. Madag.*, fam. 29, 1937, 257 (type species *Scleria elata* Thwaites).

6. *Scleria levis* Retz., *Obs.* 4, 1786, 13; S. T. Blake, *J. Arn. Arb.* 35, 1954, 226. [T.: Ex India Orientali (LD)]. — *S. zeylanica* Poir., *Enc. Méth.* 7, 1806, 3. [T.: Ceylon: *Sonnerat* (P.)]. — *S. hebecarpa* Nees in Wight, *Contr.* 1834, 117; Kunth, *En.* 2, 1837, 357; Steud., *Syn.* 2, 1855, 169; Boeck., *Linnaea* 38, 1874, 478; Ridl., *J. Str. Br. R. As. Soc.* no 23, 1891, 17; Clarke, *Fl. Br. Ind.* 6, 1894, 689; *J. Linn. Soc.*, Bot. 34, 1898, 99; *ibid.* 36, 1903, 264; Philip. *J. Sc.* 2, 1907, Bot. 105; Ridl., *Mat. Fl. Mal. Pen. (Monoc.)* 3, 1907, 113; *J. Str. Br. R. As. Soc.* no 59, 1911, 225; Camus, *Fl. Gén. I.-C.* 7, 1912, 166; Stapf & Turr. in Gibbs, *J. Linn. Soc.*, Bot. 42, 1914, 182; Merr., *En. Born.* 1921, 66; *En. Philip.* 1, 1923, 133, excl. BS 29679; Kük., *Bot. Jahrb.* 59, 1924, 58;

Ridl., Fl. Mal. Pen. 5, 1925, 179; Ohwi, Bot. Mag. Tokyo 56, 1942, 212; Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 6; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 59. [T.: in Ceylona insula: *Macrae* (CGE)]. — *S. scrobiculata* (non Nees) Mor., Syst. Verz. 1846, 98, p.p. (quoad Zollinger 349); Zoll., Syst. Verz. 1, 1854, 61. — *S. pubescens* Steud. [ex Zoll., Syst. Verz. 1, 1854, 61, nom. nud.]; Syn. 2, 1855, 168; Camus, Fl. Gén. I.-C. 7, 1912, 167; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 59. [T.: Java: Zoll. Mor. ex parte Hrbr. n. 377 (P)]. — *S. japonica* Steud., Syn. 2, 1855, 169; Miq., Ann. Mus. Bot. Lugd. Bat. 2, 1865, 146; Camus, Fl. Gén. I.-C. 7, 1912, 168. [T.: Japonia: *Herb. Goering* n. 347 (P)]. — *S. sumatrensis* var. *pubescens* (Steud.) Miq., Fl. Ind. Bat. 3, 1856, 344. Based on *S. pubescens* Steud. — *S. vestita* Boeck., Linnaea 38, 1874, 482. [T.: Hongkong: *Hance* 1157 (K)]. — *S. dietrichiae* Boeck., Flora 58, 1875, 121. [T.: Port Mackay, N. Holl.: *Am. Dietrich* (726) (BM, HBG)]. — *S. wichurai* Boeck., Bot. Jahrb. 5, 1884, 510, ex descr. [T.: Manila: *Wichura* (n.v.)]. — *S. chinensis* (non Kunth) Clarke, Philip. J. Sc. 2, 1907, Bot. 105, p.p. (quoad *Loher* 804). — *S. hebecarpa* var. *pubescens* (Steud.) Clarke, Fl. Br. Ind. 6, 1894, 689; J. Linn. Soc., Bot. 34, 1898, 99; ibid. 36, 1903, 265; Merr., En. Philip. 1, 1923, 133. Based on *S. pubescens* Steud. — ? *S. hebecarpa* f. *pilosa* Valck. Sur., Nova Guinea 8, 1912, 712. [T.: Nova Guinea: *Von Roemer* 672 (BO, fide Valck. Sur., n.v.)] — *Fig. 3h.*

Perennial with woody, shortly creeping, thick, nodose rhizome. *Stems* approximate, slender, erect, triquetrous, scabrid on the angles, glabrous to softly villous, 30–90 cm by 1–3 mm. *Leaves* equally distributed along the stem, rigid, linear, gradually narrowed to the acutish tip, glabrous to densely pubescent with long, white hairs, scabrid on the margins in the upper part, dull green, 3–8 mm wide; sheaths narrow, triquetrous, narrowly to broadly winged (at least part of them), the wings retrorsely scabrous on the margin; contraligule short, semi-orbicular, densely hirsute, on the top (always?) with a short (sometimes up to 2 mm long), triangular or ovate scarious appendage. *Inflorescence* narrow, consisting of a terminal panicle and 1–2 smaller lateral ones; axes scabrid, or villous with long white hairs; terminal panicle oblong, 5–12 cm long, with obliquely erect branches; lateral panicles few-branched, often almost spike-like, thin and loose, their peduncles exserted from the leaf-sheaths, compressed, scabrid; primary bracts foliaceous, overtopping the inflorescence, secondary ones setaceous, longer than their branches. *Spikelets* unisexual, in clusters of 2–4; male spikelets oblong-lanceolate, 3–4 mm long; stamens 3; anthers linear, c. 2 mm long, with a short purplish appendage of the connective; female spikelets ovate, 4–6 mm long, a sterile glume (vestige of the male part) usually present; glumes ovate, acute or mucronulate. *Disk* deeply 3-lobed; lobes thin, lanceolate, appressed to the nut, acute, often bidentate at the top, brown, 1–1½ mm long. *Nut* globose or ovoid-globose, terete or obscurely trigonous, not exserted from the glumes, apiculate, smooth or slightly transversely rugulose, pubescent, ultimately glabrescent, shining, white, 2–2½ mm long and wide.

Distribution: Widely distributed from Ceylon and India to S. China and Japan, and throughout Malaysia to Queensland and New Caledonia.

Ecology: In open forests (often in teak-forests), brushwood, savannahs, fallow rice-fields, etc., at low and medium altitudes, up to 1500 m.

Vernacular names: *Rumput belidang*, Mal., *djukut ilat*, Sund.,

kerissan, Jav., sianit, C. Sum., teteles, Gaju, pedugan, Bawean, tentariya, Talaud; Philip.: daat, Tag.

SUMATRA and adjacent islands: Bal 27; Bünnemeijer 227, 3714, 4030; Gusdorf 149; Japing bb 151; Jochems 3133; Koorders 21551; Lörzing 6469, 6657, 7923, 8596, 8959, 9122; Rahmat si Boeea 3467, 3662; Roeloffs bb 12334; Rutten-Kooistra 20, 51; Surbeck 273; Verboom 25; De Vogel s.n.

MALAY PENINSULA: Burkill SF 4628; Corner SF 37595; Curtis 1795, 1828; Henderson SF 18300, SF 24072, SF 38228; Holttum SF 38283; Hose 67; Hume 7744; Lemann s.n.; Machado 11536; Mohd Nur SF 31352; Nauen SF 35862, SF 37480, SF 38180; Ridley 2143, 5811, 8166, 11536, 14353; Seimund 279; Symington 21332, 21435, 22974; Teruya 2568.

JAVA and adjacent islands: Backer 696, 6453, 22068, 23555, 27064, 30365, 36959; Bakhuizen van den Brink 5373, 5488, 6918; Bakhuizen van den Brink fil. 916, 2938; Becking s.n.; den Berger 273; Beumée A 263, A 538, A 596, 3541, 3720, 4902, 5008, 5074, 5164, 5224, 5392, 5487; de Boer & Wolff von Wülffing 4232; Buwalda 2799, 3301; Dorgelo 1776 p.p.; Franck 92; Hallier 562a, 567; Harmsen 91; Hemken 4; Horsfield s.n.; Junghuhn s.n.; Karta 123; Kern 8245; Kievits 3305; Koorders 21929, 33544, 40810, 41464, 42503, 44107; van Ooststroom 12578; van Steenis 4756, 5347, 6671, 7476, 11384, 11787, 11788, 11789, 12526; Thorenaar 298; Vorderman 124; de Vries 59; Wisse 687; de Wit 4199; Wolff von Wülffing 3926; Zollinger 349, 377 p.p.

LESSER SUNDA ISLANDS: Monod de Froideville 1934; van Steenis 18134.

BORNEO and adjacent islands: Darnton 23; Gibbs 2774; Henderson SF 20213, SF 20236; Lenart 6; van Loenen 1; Motley 794; van Steenis 991; Hub. Winkler 2972.

PHILIPPINES: Conklin PNH 17597; Edaño PNH 11587; Loher 804; Ramos & Edaño BS 30957, BS 37468, BS 39194, BS 49549; Soriano PNH 16407.

CELEBES and adjacent islands: Bünnemeijer 10706; Kjellberg 436; Lam 3387; van Steenis 10374.

MOLUCCAS: A. J. Jansen s.n.; Chr. Smith s.n.

NEW GUINEA and adjacent islands: Miss Blackwood 165; Brass 5996, 7691, 7877, 8264, 8715, 27234; Clemens 7958a, 8152; Crutwell 180; Fryar NGF 3607; 't Hart & van Leeuwen M 11; Kanehira & Hatusima 13202; Pleyte 908; Robbins 47; Saunders 8; Schlechter 18458; Womersley, Floyd & McKee 6190.

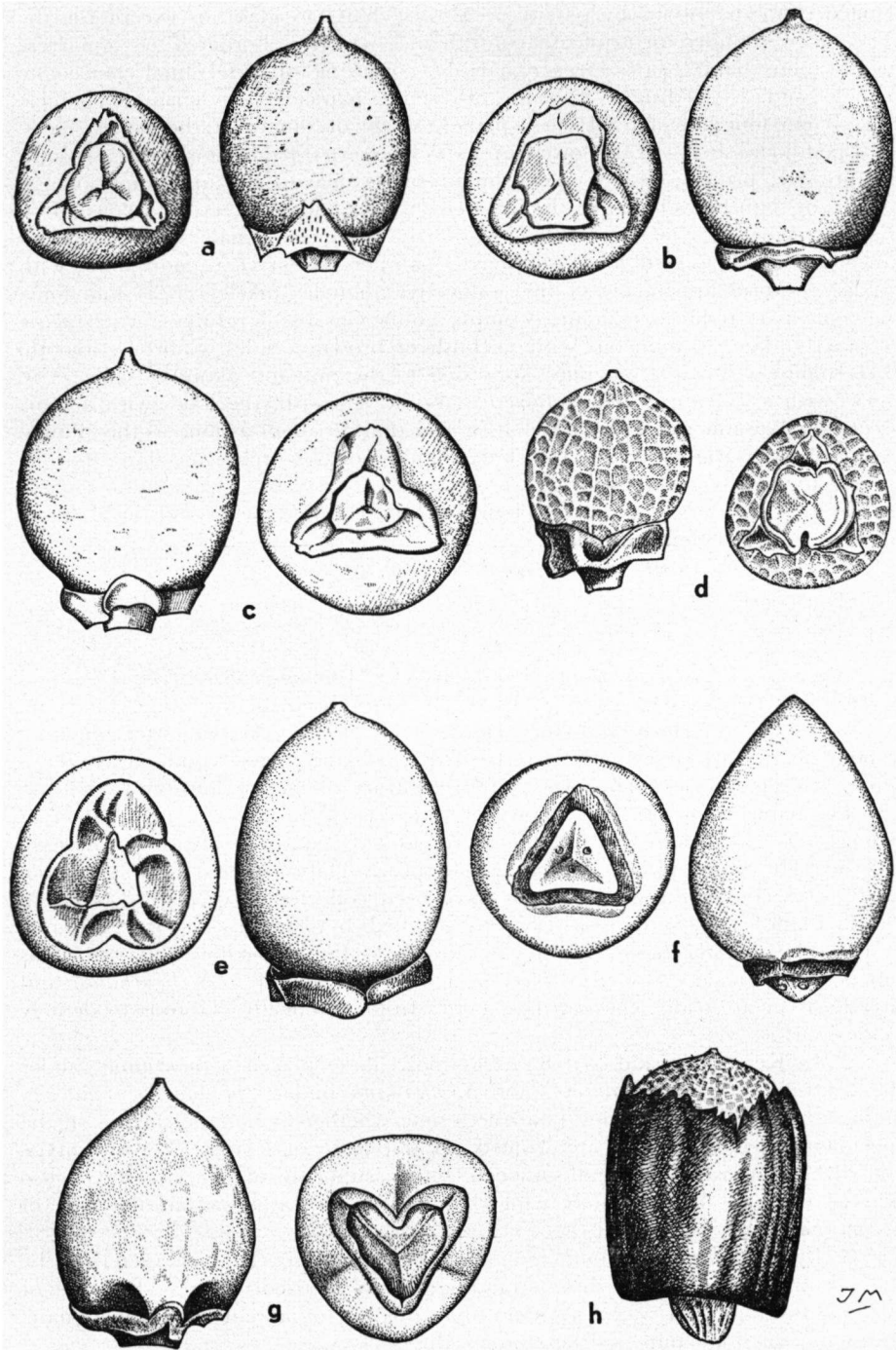
Notes. 1. A small and slender species among its relatives and for this reason sometimes confused with *S. lithosperma*, but easily distinguishable from that species by the presence of a well-developed hypogynous disk.

2. Clarke (1907) referred Loher 804 to *S. chinensis* Kunth, probably on account of the small but distinct scarious appendage of the contraligule. However, *S. chinensis* Kunth is a superfluous name for *S. ciliaris* Nees, a species with short, rounded lobes of the disk.

7. *Scleria benthamii* C. B. Clarke, Kew Bull., add. ser. 8, 1908, 58. [T.: Brisbane R.: F. von Müller 61 (K)]. — *S. tessellata* (non Willd.) Benth., Fl. Austr. 7, 1878, 430, excl. var. *debilis*. — *S. khasiana* C. B. Clarke in Hook. f., Fl. Br. Ind. 6, 1894, 692; J. Linn. Soc., Bot. 34, 1898, 102, non Boeck. (1890). [T.: Khasia: Clarke 40052, 44613, 44683, 44798 (K)]. — Fig. 3i.

Perennial. Stems slender, tufted, erect, triquetrous, glabrous and smooth, (30—)45—120 cm by 1—3 mm. Leaves herbaceous, flat, exactly linear, rather abruptly narrowed to the obtusish tip, glabrous to more or less villous by long white hairs, scabrid on the margins towards the apex, otherwise smooth, (2—)3—7 mm wide; sheaths triquetrous, narrow, wingless to rather broadly

Fig. 5. Nuts and disks of: a. *Scleria terrestris* (L.) Fass. (*S. radula* Hance); b. ditto (*S. haematostachys* Boeck.); c. ditto (*S. exaltata* Boeck.); d. *S. ciliaris* Nees; e. *S. psilorrhiza* Clarke; f. *S. junghuhniana* Boeck.; g. *S. poaeiformis* Retz.; h. *S. sumatrensis* Retz. — All $\times 10$.



winged, smooth, villous by patent or retrorse hairs to glabrous except for the very short, rounded or truncate contraligule, which is bordered by a narrow membranous band. *Inflorescence* narrow, consisting of a terminal, lanceolate panicle and 1—2 distant fascicles of lateral panicles, the terminal panicle $1\frac{1}{2}$ —5 cm long, the lateral ones smaller, single or binate at the nodes, erect, their peduncles short (or the lowest up to 5 cm exerted from the sheath), smooth, compressed; primary bracts erect, similar to the leaves, the uppermost one as long as or slightly overtopping the inflorescence, secondary bracts setaceous, often slightly recurved. *Spikelets* unisexual, shortly peduncled; male spikelets linear-lanceolate, 3— $4\frac{1}{2}$ mm long; stamens 3; anthers linear, c. 2 mm long, with reddish, scabrid appendage of the connective; female spikelets 4—5 mm long, the male part reduced to a small empty glume or absent; glumes ovate, acute or mucronulate, stramineous with purplish or brownish sides, glabrous, smooth. *Disk* shallowly lobed, triangular, appressed to the nut and about as wide as it, thick, with c. $\frac{1}{3}$ mm broad, reflexed margins, yellowish, the lobes with a short erect, subulate mucro. *Nut* somewhat shorter than to about as long as the glumes, ovoid, obtusely trigonous, not apiculate, rugulose or obscurely cancellate, sparsely pubescent, finally glabrescent, glossy, white, $2\frac{1}{3}$ — $2\frac{1}{2}$ by 2— $2\frac{1}{5}$ mm.

Distribution: Khasia, Thailand, Indo-China, Queensland; in Malaysia once collected in the Philippines.

Ecology: In dry open grasslands, 1500 m.

PHILIPPINES. Luzon. Prov. of Benguet, Baguio to Ambuklao: Merrill 4370 (BO, K, NY).

Notes. 1. *Scleria thomsoniana* Boeck., Linnaea 38, 1874, 479, and *S. khasiana* Boeck., Cyp. Nov. 2, 1890, 29, were based on the same collection, viz *Scleria* sp. 12, Herb. Ind. Or., Hook. f. & Thoms. As the latter binomial is nomenclaturally superfluous, Clarke used the same binary combination for a quite different species. This procedure is contrary to the present-day Code, and Clarke's name is illegitimate. However, there is no need for a new name, as *Scleria benthamii* from Queensland is undoubtedly conspecific with *S. khasiana* Clarke. The type of *S. benthamii* is practically glabrous, that of *S. khasiana* softly hairy, but glabrous specimens have been collected, e.g. Kerr 3358 from N. Thailand, Doi Suthep, which was labelled by Turrill "*Scleria khasiana*, C. B. Cl., var. *glaberrima* Turrill var. nov." As far as I know this name has not been published. Also in *S. levis*, which is very similar to *S. benthamii* and may be its nearest ally, the hairiness varies from practically glabrous to densely villous.

2. In Kew Bull., add. ser. 8, 1908, 133, Clarke placed *S. benthamii* under the heading "*vaginae trialatae*" and *S. khasiana* under "*vaginae not aut vix alatae*". When I was at Kew I failed to note whether or not the sheaths in the specimens cited by Clarke are winged. A duplicate of Clarke 44798 (syntype coll., BM) has wingless sheaths indeed, but a duplicate of Clarke 44683 (also syntype coll., C) has distinctly winged middle leaf-sheaths, as has the type of *S. benthamii*.

3. Both *Scleria benthamii* and *S. khasiana* are especially characterized by the peculiar shape of the disk reminding one of a tricorn hat. This type of disk is also found in *S. tricuspidata*, but this is an annual with tuberculate, distinctly apiculate nut (see also under this species).

4. *Scleria benthamii* is also found in Thailand and Indo-China. The only Malaysian collection is rather poor: ripe nuts I found in the specimen at Kew; they leave no doubt as to the identity.

8. *Scleria oblata* S. T. Blake, *Blumea* 11, 1961, 219. [T.: SE. Celebes: *Elbert 3078* (BRI; dupl. in L)]. — *S. levis* (non Retz.) Willd., *Sp. Pl.* 4, 1805, 314 ('*laevis*'); Nees in Wight, *Contr.* 1834, 117; Kunth, *En.* 2, 1837, 342; Mor., *Syst. Verz.* 1846, 98; Zoll., *Syst. Verz.* 1, 1854, 61; Steud., *Syn.* 2, 1855, 169; Miq., *Fl. Ind. Bat.* 3, 1856, 341, incl. *f. β*; Thwaites, *En. Pl. Zeyl.* 1864, 354; Boeck., *Linnaea* 38, 1874, 512; Clarke, *Fl. Br. Ind.* 6, 1894, 694; J. Linn. Soc., *Bot.* 34, 1898, 103; Ridl., *J. Str. Br. R. As. Soc.* no 23, 1891, 18; *ibid.* no 46, 1906, 228; Mat. *Fl. Mal. Pen. (Monoc.)* 3, 1907, 111; Hochreutiner, *Bull. N. Y. Bot. Gard.* 6, 1910, 263; Winkl., *Bot. Jahrb.* 44, 1910, 526; Camus, *Fl. Gén. I.-C.* 7, 1912, 169; Merr., *En. Born.* 1921, 66; *En. Philip.* 1, 1923, 133, excl. *Merrill 8380*; Ridl., *Fl. Mal. Pen.* 5, 1925, 177; Utt. in Backer, *Bekn. Fl. Java (em. ed.)* 10, 1949, fam. 246, 57. — *Fig. 3 j*.

Nearly glabrous and smooth perennial, with woody, shortly creeping rhizome. *Stems* approximate, rather slender, erect, triquetrous, smooth and glabrous, 60–100 cm (in scrub sometimes sprawling and taller) by 2–3 mm. *Leaves* rigid, patent, linear, gradually narrowed to the acutish tip, somewhat puberulous on the upper side near the base, otherwise glabrous, minutely scabrid especially in the upper part, with revolute margins, 4–9 mm wide, the upper ones distant, the middle ones more approximate (but not whorled); sheaths narrow, triquetrous, not winged, smooth, usually puberulous at the top; contraligule very short, much broader than long, obtuse, ciliate, with a narrow scarious margin. *Inflorescence* rather narrow, rigid, consisting of a terminal partial panicle and 2–5 lateral ones, 15–25 cm long, 3–5 cm wide; axes glabrous, smooth or nearly so; partial panicles erect, dense, contiguous or the lower ones somewhat distant, compound, pyramidal; peduncles solitary or sometimes binate, shortly exerted from their sheaths; primary bracts foliaceous, overtopping the inflorescence, secondary ones small, setaceous. *Spikelets* unisexual, in clusters of 2–3, with purplish brown glumes; male spikelets distinctly peduncled, slightly curved, oblong-lanceolate, $3\frac{1}{2}$ –4 mm long; stamens 3; anthers linear, $1\frac{1}{2}$ –2 mm long, with a conical, smooth, purplish appendage of the connective; female spikelets ovate, 4– $4\frac{1}{2}$ mm long, the male part reduced to a single glume sometimes with vestigial stamens in its axil; glumes broadly ovate, acute or apiculate, minutely ciliolate. *Disk* deeply 3-lobed, lobes firm, broadly ovate, obtuse, appressed to the nut, entire or somewhat denticulate at the top, pale, greenish or reddish striolate, 1– $1\frac{1}{4}$ mm long, sinuses acute. *Nut* shorter than the glumes, depressed-globose, not or hardly umbonulate, glabrous and smooth, at first blackish, shining white when mature, c. 2 mm by $2\frac{1}{2}$ – $2\frac{4}{5}$ mm.

Distribution: Ceylon; from Assam through Burma and Thailand to Indo-China and S. China; in Malaysia: Sumatra, Banka, Malay Peninsula, W. Java, Borneo, Philippines, SE. Celebes.

Ecology: In open wet places: road-sides, light forests, brushwood, at low altitudes, up to 700 m (according to Merrill in the Philippines up to 1200 m).

Vernacular names: *Kerisan*, Sum. E. C., *sialit dudok*, *seranek*, *sesayok*, Mal. Pen., *badang*, *tali juru*, Borneo.

MALAY ARCH.: *Kunstler* 101.

SUMATRA and adjacent islands: *Anta* 438 p.p.; *Asdat s.n.*; *Docters van Leeuwen* 3234 p.p.; *Lörzing* 3699, 4073, 9098, 9627, 9756, 12990 p.p.; *Meijer* 5722, 7328.

MALAY PENINSULA and adjacent islands: *Burkill SF* 4614, *SF* 4615; *Burkill & Haniff SF* 13124, *SF* 13387; *Corner s.n.*; *Curtis* 22; *Furtado SF* 18630; *Gaudichaud* 92; *Griffith s.n.*; *Holttum & Henderson s.n.*; *Hervey s.n.*; *Hullett s.n.*; *Hume* 7739 A; *Jensen* 41; *Mohd Nur s.n.*; *Nauen SF* 35859, s.n.; *Ridley* 1479, 1719, 5809, 6112, s.n.; *Rostado s.n.*; *Seimund* 257; *Sinclair s.n.*; *Symington FMS* 26814, *FMS* 37924; *Wallich* 3410 p.p.; *Wilkes B* 5, 28.

W. JAVA and adjacent islands: *Backer* 26518, 33811; *Blume s.n.*; *van Borssum Waalkes* 636; *van Hasselt s.n.*; *Karta* 190; *Kern* 8423, 8664; *Kern & Meijer* 1150; *van Steenis* 11787a, 12555; *de Wit* 4210; *Zollinger* 469.

BORNEO and adjacent islands: *Aet* 183; *Clemens* 20552, 20566, 21363; *Keith* 8864; *Ramos* 1413, 1709; *van Royen* 2890.

PHILIPPINES: *Merrill* 9244; *Santos* 4740, 5991.

SE. CELEBES: *Elbert* 3078.

Note. Clarke, Fl. Br. Ind. 6, 1894, 692—694, placed this species and *Scleria ciliaris* (*S. bancana*) in the group with pseudo-whorled leaves, along with *S. purpurascens* (*S. multifoliata*) and *S. sumatrensis*, which are certainly not their closest allies. The middle leaves in *S. oblata* and *S. ciliaris* are more or less approximated, but not whorled.

9. *Scleria terrestris* (L.) Fass., *Rhodora* 26, 1924, 159, incl. *var. latior* (Clarke) Fass. et *var. decolorans* (Clarke) Fass.; S. T. Blake, Proc. R. Soc. Queensl. 62, 1952, 89; J. Arn. Arb. 35, 1954, 228. Based on *Zizania terrestris* L. — *Katu-Tsjolam* Rheede, Hort. Mal. 12, 1703, 113, t. 60. — *Zizania terrestris* Linné, Sp. Pl. 2, 1753, 991. Based on *Katu-Tsjolam* Rheede. — *Schoenus paniculatus* Burm. f., Fl. Ind. 1768, 19. [T.: Ind. Or. (G)]. — *Diaphora cochinchinensis* Lour., Fl. Cochinch. 1790, 578; ed. Willd. 1793, 709. [T.: Cochinchina (BM)]. — *Olyra orientalis* Lour., Fl. Cochinch. 1790, 552; ed. Willd. 1793, 674. [T.: Cochinchina]. — *S. scrobiculata* (non Nees) Miq., Fl. Ind. Bat. 3, 1856, 342, p.p. (specim. Jungh.). — *S. laevis var. scaberrima* Benth., Fl. Hongk. 1861, 400. [T.: Hongkong: *Harland*]. — *S. radula* Hance, Ann. Sc. Nat., Bot. 18, 1862, 232; Clarke, Fl. Br. Ind. 6, 1894, 691; J. Linn. Soc., Bot. 34, 1898, 101; ibid. 36, 1903, 266; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 111; Ridl., Fl. Mal. Pen. 5, 1925, 178. [T.: Honkong: *Hance* 1157 (BM)]. — *S. elata* Thwaites, En. Pl. Zeyl. 1864, 353; Boeck., Linnaea 38, 1874, 487; Clarke, Fl. Br. Ind. 6, 1894, 690, incl. *var. latior* Clarke et *var. decolorans* Clarke; J. Linn. Soc., Bot. 34, 1898, 100; ibid. 36, 1903, 264; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 114; Camus, Fl. Gén. I.-C. 7, 1912, 167; Ridl., Fl. Mal. Pen. 5, 1925, 179; H. Pfeiff., Mitt. Inst. Allg. Bot. Hamb. 7, 1928, 174. [T.: Mont. Khasia: *Scleria* 15, *Hook. & Thoms.* (CGE, L, NY, P, U); *CP* 825 (BM, K, P), 3030 (BO, CGE, K, P), 3032]. — *S. aspera* Boeck., Linnaea 38, 1874, 483, ex descr. [T.: China: *Meyen* (n.v.)] — *S. melanostoma* Nees ex Boeck., Linnaea 38, 1874, 514; Clarke, Fl. Br. Ind. 6, 1894, 692; J. Linn. Soc., Bot. 34, 1898, 102. [T.: Pen. Ind. Or.: *Wight* 2377 (B, n.v.) = *Wight* 1002 (K)]. — *S. hirsuta* Boeck., Linnaea 38, 1874, 489, ex descr.; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 58. [T.: Java: *Junghuhn* (n.v.)] — *S. exaltata* Boeck., Bot. Jahrb. 5, 1884, 511. [T.: Ceylon: *Thwaites CP* 3031 (BO)]. — *S. hasskarliana* Boeck., l.c. [T.: *Scleria* 15, *Hook. & Thoms.* p.p.]. — *S. haematostachys* Boeck., l.c. p. 512, ex descr.; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 58. [T.: Java: *Wichura* (n.v.)]. — *S. ploemii* Boeck., l.c. p. 513.

[T.: Java: *Ploem* (dupl. in L)]. — *S. kuntzei* Boeck., Cyp. Nov. 1, 1888, 34. [T.: Java: *O. Kuntze* (5033) (NY)]. — *S. rinkiana* Boeck., Cyp. Nov. 2, 1890, 30; Clarke, Fl. Br. Ind. 6, 1894, 694. [T.: Pulo Pinang: *Rink*]. — *S. chinensis* var. *biauriculata* Clarke, Fl. Br. Ind. 6, 1894, 690; J. Linn. Soc., Bot. 34, 1898, 101. [T.: Ceylon: *Thwaites* CP 825 (BM, K, P)]. — *S. multifoliata* (non Boeck.) Clarke, Philip. J. Sc. 2, 1907, Bot. 106 p.p. (Merrill 4834). — *S. luzonensis* Palla, Allg. Bot. Zeitschr. 13, 1907, 49; Merr., En. Philip. 1, 1923, 134. [T.: Luzon: *Merrill in Kneuck., Cyp. exsicc.* 167 (C, K, L)]. — *S. corymbosa* (non Roxb.) Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 109, p.p.; Fl. Mal. Pen. 5, 1925, 176, p.p. — *S. chinensis* (non Kunth) Clarke, Philip. J. Sc. 2, 1907, Bot. 105, p.p. — *S. cochinchinensis* (Lour.) Druce, Rep. Bot. Exch. Club Br. Isles 4, 1917, 646; H. Pfeiff. in Fedde, Rep. 26, 1929, 263; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 57. Based on *Diaphora cochinchinensis* Lour. — *S. levis* (non Retz.) Merr., En. Philip. 1, 1923, 133, p.p. (Merrill 8380). — *S. hookeriana* (an Boeck.?) Kük., Bot. Jahrb. 59, 1924, 59. — *S. chinensis* var. *luzonensis* (Palla) Uitt., Rec. Trav. Bot. Néerl. 32, 1935, 201. Based on *S. luzonensis* Palla. — *S. chinensis* var. *luzonensis* f. *pilosa* Uitt., l.c. [T.: Sarawak: *Richards* 1660 (K); Uttien erroneously cited *Richards* 2016]. — *Fig. 5 a—c.*

Perennial with shortly creeping, woody rhizome. *Stems* slender to very robust, erect or scrambling over bushes and then up to a height of several meters, rigid, triquetrous, glabrous to pubescent, more or less scabrous, up to 12 mm thick in the lower part. *Leaves* subcoriaceous, rigid, linear, gradually narrowed into a very long tip, all scattered, (2—)5—20(—40) mm wide, margins and not rarely the nerves scabrous, margins recurved when dry; sheaths triquetrous, more or less widened upwards, glabrous or pubescent, scabrid, often 3-winged, the wings not rarely narrow or absent; contraligule short, rounded, with a brown, scarious margin, glabrous or ciliate. *Inflorescence* very variable in size, consisting of up to 4 distant partial panicles; partial panicles pyramidal, with ascending to rectangularly divaricate, scabrid branches; peduncles single at the nodes, compressed, usually distinctly exerted from the sheaths, scabrid; primary bracts similar to the leaves, overtopping the inflorescence, secondary ones long, setaceous, scabrid, ciliate at the base. *Spikelets* unisexual, solitary or 2—3 together; male spikelets lanceolate, 3—4 mm long; stamens 3; anthers linear, 1—2 mm long, with a short, smooth, whitish to purplish appendage of the connective; female spikelets broadly ovate, $3\frac{1}{2}$ — $4\frac{1}{2}$ mm long, the male part reduced to a sterile glume. *Disk* shortly 3-lobed; lobes appressed, short, rounded, sometimes slightly denticulate at the top, ferrugineous or yellow, purplish striolate. *Nut* ovoid or subglobose, terete to rather distinctly trigonous in the upper part, umbonulate, smooth to cancellate, often minutely hairy when young, glabrescent, shining, white or finally purplish or blackish, $2\frac{1}{2}$ —3 mm by 2—3 mm.

Distribution: In the wide circumscription given above *S. terrestris* is widely distributed, extending from Ceylon and India to China, Formosa, the Riu Kiu Islands, and Australia. Common everywhere in Malaysia.

Ecology: In primary and secondary forests, in open scrub, in swampy places, from sealevel up to 2200 m.

Vernacular names: *ilat*, *ilat gobang*, Sund., *kerisan*, *rija-rija*, N. Sum., *patari*, Celebes, *tentariŋa*, Talaud, *jebbing*, Sibil valley; Philip.: *papan*, *agagedán*, *egegedán*, Bon., *mankot*, Ig.

SUMATRA and adjacent islands: *Bartlett* 7942; *Beumée* A 458, 844; *van Borssum Waalkes* 2843; *Bünnemeijer* 75a, 2514, 8775, 8887; *van Daalen* 366; *Dames* 56; *Elbert* s.n.; *Jacobson* s.n.; *Keers* 5; *Lörzing* 4454, 4783, 4961, 6128, 6657a, 7754, 8620, 9447, 9564, 9799, 9911, 12990 p.p., 14938; *Meijer* 3499; *Rahmat si Boeoa* 4880, 6192, 10040; *Ridley* s.n.; *Roesil* 819; *Schiffner* 1652; *van Steenis* 9905; *Yates* 572.

MALAY PENINSULA and adjacent islands: *Birch* s.n.; *Burkill* HMB 810, SF 3203; *Burkill & Haniff* SF 12908; *Corner* s.n.; *Corner & Nauen* SF 37862; *Derry* 907; *Goodenough* s.n.; *Griffith* s.n.; *Henderson* 11410, SF 38266; *Holtum* SF 9576, SF 10745; *Hume* 9036, 9148, 9753a; *Kelsall* 1969; *King's coll.* 1929, 2506; *Kloss* s.n.; *Langlassé* s.n.; *Machado* 11538, 11541; *Mohd Nur* SF 11117, SF 11712, SF 32622; *Nauen* SF 38044, SF 38181; *Purseglove* P 4152, P 4154; *Ridley* 9334, 10851, 11944, 11946, 12049, 13866, 13867, 15716, 15717, 16030, 16191, s.n.; *Robinson* s.n.; *Robinson & Kloss* 6108; *Seimund* 881; *Sinclair & Kiah* SF 38727; *Sow* CF 46177; *Symington* 25880, 36107.

JAVA and adjacent islands: *Adelbert* 483; *Arsin* 19620; *Backer* 1518, 5648, 9213, 10632, 10936, 11489, 14805, 16289, 18613, 22686, 22918, 23311, 25695; *Bakhuizen van den Brink* 1001, 6143; *Blume* s.n.; *Boerlage* s.n.; *Bruggeman* 26, 331; *Danser* 5884; *Docters van Leeuwen* 12029; *Forbes* 259, 877b; *Hallier* 563, 618; *Junghuhn* s.n.; *Kern* 8245a, 8480; *Koorders* 15154, 15239, 23923, 40643, 41323, 41449, 44339; *Kuntze* 4599, 5033; *Lanjouw* 235; *Lörzing* 1639; *Main* 199; *Mohd Enoh* 157; *Nedi & Idjan* 31; *Noerks* s.n.; *van Ooststroom* 13153, 13215, 13472, 13536, 13780, 13852; *van der Pijl* 456; *Pleyte* 179; *Raap* 612; *Ridley* s.n.; *Scheffer* 6376; *Schiffner* 1589; *Smith & Rant* 591; *van Steenis* 90, 4974, 5248, 12298; *Went & Lam* 1544; *Winckel* 1468, 1496, 1768; *Wisse* 1136; *de Wit* 4277; *Zippel* s.n.

LESSER SUNDA ISLANDS: *Backer* 12535; *Rensch* 1080.

BORNEO: *Clemens* 20212, 32579, 32599, 32795, 40032, 50038; *Endert* 4609; *Richards* 1660, 2016; *Ridley* s.n.

PHILIPPINES: *Clemens* 16583; *Edaño* PNH 12147, PNH 18062, PNH 19756, PNH 21922, BS 41776, BS 76223; *Edaño & Gutierrez* PNH 38487; *Elmer* 8401, 10326; *Merrill* in *Kneucker* 167, *Phil. Pl.* 560, 3921, 3958, 3964, 4834, 5321, 8207, 8380; *Ramos* BS 14760, BS 30194, BS 41985; *Ramos & Edaño* BS 28653, BS 28744, BS 30712, BS 39145, BS 48613; *Robinson* BS 9857; *Santos* 5809; *Vanoverbergh* 2835; *Williams* 730, 1227.

CELEBES: *Bloembergen* 3933, 4047; *Eyma* 1467 p.p., 1470, 1478, 3476, 3811; *Forsten* 156, 159; *Kjellberg* 3735. *Talau*: *Lam* 3247.

MOLUCCAS: *Eyma* 2589; *Stresemann* 153.

NEW GUINEA: *Brass* 4779, 25685; *Docters van Leeuwen* 10459, 10555; *Eyma* 4661; *Hoogland & Pullen* 5973, 6275; *Kalkman* 4139; *Mayr* 41; *Warburg* 21031.

Notes. 1. Of the Asiatic species of *Scleria* this is the most difficult to deal with. All perennial *Scleriae* with scattered leaves, short contraligule bordered by a brown scarious band, unisexual spikelets, and a disk with short, rounded lobes are covered by the description given above. No wonder that the much varied facies of this widely distributed species has led to the distinction of numerous segregates, which according to me cannot be upheld on a specific level. They at most represent a series of races connected by numerous intermediates. I fully agree with S. T. Blake, who already in 1954 gave a long list of names in his opinion synonymous with *Scleria terrestris*.

It was especially Boeckeler who described a large number of species, most of them based on a single, often incomplete or immature, specimen. His types in the Berlin Herbarium were all destroyed, and for the species based on them one has to rely on duplicates in other herbaria or on his descriptions. When we look over an extensive material it becomes evident that Boeckeler's species cannot be upheld and even cannot be the basis of well-circumscribed subspecies.

However unsatisfactory this may seem, I have therefore refrained from splitting up the species into subspecies or varieties; this appeared to be impossible from herbarium material alone. A brief survey of those forms which are often recognized as species follows here.

2. Typical *Scleria terrestris* has distinctly winged leaf-sheaths, and cancellate white nuts, often minutely hairy when young, glabrescent at maturity. It occurs throughout the area given above, but from Farther India and the Malay Peninsula it is represented by a few collections only.

3. *Scleria radula* Hance (*S. aspera* Boeck.; Fig. 5a) is vegetatively scarcely different. It was characterized by Clarke as a robust, very slightly hairy plant with very scabrous, broad leaves, long setaceous secondary bracts, and white, smooth nuts. Additional characters are the narrowly winged leaf-sheaths and the rather distinctly trigonous upper half of the nut. *Scleria radula* extends from S. China through Indo-China and the Malay Peninsula to Sumatra, sometimes associated with the typical *S. terrestris*. Several Malaysian collections perfectly agree with the type from Hongkong. In a large number of them, however, the nuts are more or less cancellate, and in some, smooth nuts and cancellate ones occur on the same inflorescence. In other specimens referred to *S. radula* the secondary bracts are not more conspicuous than in *S. terrestris*. There is also a considerable variation regarding hairiness, scabridity, and width of the leaves, the latter sometimes being smooth, densely villous, or unusually narrow. I can see no sharp demarcation between *S. radula* and stout forms of *S. terrestris*. The latter were distinguished by Clarke as *S. elata* var. *latior*. Holttum (in sched. Sing.) reduced *S. radula* to a variety of *S. terrestris*.

The specimens cited under *S. radula* by Camus, Fl. Gén. I.-C. 7, 1912, 165, all belong to *S. tonkinensis* C. B. Clarke.

4. *Scleria haematostachys* Boeck. (Fig. 5b) is common in W. Java. It has also smooth or slightly cancellate nuts, and may be somewhat nearer to the typical *S. terrestris* than *S. radula* is. In general it has narrower, not very scabrous leaves, less conspicuous secondary bracts, and dark purplish inflorescences. Specimens with perfectly smooth nuts, but otherwise not differing from typical *S. terrestris*, occur in the Philippines (e. g. *Elmer 10326*).

5. Often the exposed part of the nut becomes purplish to blackish with age. *Scleria kuntzei* Boeck., *S. melanostoma* Nees ex Boeck., *S. rinkiana* Boeck., and *S. elata* var. *decolorans* C. B. Clarke, were mainly based on this phenomenon not deserving nomenclatural recognition. Boeckeler placed *Scleria kuntzei* next to *S. purpurascens* Steud. (*S. multifoliata* Boeck.), which is certainly wrong; according to me it is a more or less depauperated *S. terrestris*. *Scleria rinkiana*, mentioned in the Flora of British India as an undetermined species, was referred to the synonymy of *S. terrestris* (*S. elata* Thwaites) by Clarke in 1903. As to the type of *S. melanostoma* the following remarks of Clarke on the sheet of *Wight 1002* in the Kew Herbarium may be cited:

"Boeckeler has founded his *Scleria melanostoma* on *Wight n. 2377* a very young scrap in h. Berol; but the really founded it on *Wight n. 1002* in herb. Berol. which is = this Kew n. 1002. The *Wight n. 2377* in h. Berol. is the same, but the *Wight 2377* in h. Kew greatly differs. The present plant is therefore the type verified also by Mr. N. E. Brown of *Scleria melanostoma* Boeck., which only differs from *S. elata* Thwaites in having the sheaths wingless."

Clarke 24841 and Griffith 6123, both cited under Clarke's *S. elata* var. *decolorans*, have wingless sheaths and I can in no way distinguish them from *S. melanostoma*.

6. Thus in the *Scleria terrestris*-complex also the character of the sheaths of the middle leaves being winged or wingless appears to be unfit for specific

delimitation. When wings are present their tops may be produced beyond the mouth of the sheath or fall short of it. Clarke placed *Scleria hookeriana* under the heading "sheaths winged, sometimes in *S. elata* and *S. chinensis* obscurely", at the same time admitting that in *S. hookeriana* the wings are occasionally distinct and in *S. chinensis* var. *biauriculata* sometimes obsolete! In the type collection of *S. hookeriana* the inflorescence is densely contracted, on which character Boeckeler mainly founded his species, but Clarke stated already that in well-developed specimens the panicle is much larger and more compound (see his Illustrations of Cyp., 1909, t. 128). I do not understand why Clarke thinks *S. hookeriana* is most easily known from *S. terrestris* by the panicle-branches ascending, not rectangularly divaricate. I presume that *S. hookeriana*, reported from Khasia and S. China, falls also within the variability of *S. terrestris*, but I have seen only a few specimens of it. The New Guinea specimens Kükenthal (1924) referred to *S. hookeriana* are typical *S. terrestris*.

7. The scarious brown band along the margin of the contraligule is one of the best characters to distinguish *Scleria terrestris* from its nearest allies. Clarke based his *S. chinensis* var. *biauriculata* on specimens in which this scarious appendage is broader than usual (c. 4 mm), citing "*S. elata* Thw. Enum. 353, partly, *S. exaltata* Boeck. in Engler Jahrb. V, p. 511. — Ceylon, Thwaites. Singapore, Ridley (n. 1556)."

There is considerable confusion in this part of Clarke's treatment of the genus in the Flora of British India. Ridley 1556 is cited both under *S. chinensis* and under its variety *biauriculata*; but in Journ. Linn. Soc., Bot. 34, 1898, 101 only under *S. chinensis*, so apparently excluded from the variety. However, l. c. p. 102 it is also cited as *S. bancana*! In my opinion Ridley 1556 should be referred to *S. ciliaris* Nees (= *S. chinensis* Kunth = *S. bancana* Miq.), and the natural place of Thwaites's plants is in *S. terrestris*. In *S. ciliaris* the scarious appendage of the contraligule is drawn out into a lanceolate tongue. It must, however, be admitted that *S. ciliaris* and *S. terrestris* are very close to each other, and that their delimitation almost solely rests upon the different shape of the contraligule.

Later on Clarke (1907) extended his concept of *Scleria chinensis* in applying this name to slender plants from Luzon, thus wrongly introducing it into Philippine literature. On such slender specimens Palla based his *Scleria luzonensis*, which name Uittien reduced to varietal rank (*S. chinensis* var. *luzonensis*).

8. Very stout, broad-leaved, hirsute specimens, answering Boeckeler's description of *Scleria hirsuta*, have been collected in Java (see Uittien, 1949, p. 58). I can not separate them satisfactorily from broad-leaved, more or less glabrous *S. terrestris*.

10. *Scleria ciliaris* Nees in Wight, Contr. 1834, 117; in Hook. & Arn., Bot. Beech. Voy. 1837, 229; S. T. Blake, J. Arn. Arb. 35, 1954, 227. [T.: China, Macao: Vachell (K); Millett]. — *S. chinensis* Kunth, En. 2, 1837, 357; Steud., Syn. 2, 1855, 179; Benth., Fl. Hongk. 1861, 400; Boeck., Linnaea 38, 1874, 486; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18; Clarke, Fl. Br. Ind. 6, 1894, 690, excl. var. *biauriculata* Clarke; J. Linn. Soc., Bot. 34, 1898, 101; ibid. 36, 1903, 263; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 114; Camus, Fl. Gén. I.-C. 7, 1912, 167; Ridl., Fl. Mal. Pen. 5, 1925, 180. New name

for *S. ciliaris* Nees. — *S. bracteata* (non Cav.) Brongn. in Duperrey, Voy., Bot., 1834, 165 (Amboine: *d'Urville* 2, P). — *S. scrobiculata* (non Nees) Mor., Syst. Verz. 1846, 98, p.p. (quoad *Zollinger* 469b). — *S. bancana* Miq., Sum. 1861, 262, 602; Clarke, Fl. Br. Ind. 6, 1894, 693; J. Linn. Soc., Bot. 34, 1898, 102; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 228; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 112; Winkler, Bot. Jahrb. 44, 1910, 526; Valck. Sur., Nova Guinea 8, 1912, 712; Camus, Fl. Gén. I.-C. 7, 1912, 168; Stapf & Turr. in Gibbs, J. Linn. Soc., Bot. 42, 1914, 182; Merr., En. Born. 1921, 66; En. Philip. 1, 1923, 133; Ridl., Fl. Mal. Pen. 5, 1925, 178; H. Pfeiff., Mitt. Inst. Allg. Bot. Hamb. 7, 1928, 175; Kük., Bot. Jahrb. 69, 1938, 261; Ohwi, Bot. Mag. Tokyo 56, 1942, 212; Utt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 56. [T.: Banka: circa Muntok: *Kurz* (U)]. — *S. malaccensis* Boeck., Linnaea 38, 1874, 507; K. Schum., Bot. Jahrb. 13, 1891, 266; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18. [T.: Malacca: *Gaudichaud* (Fl, K, P); *Griffith* (K)]. — *S. bancana* var. *nana* Ridl., J. Str. Br. R. As. Soc. no 59, 1911, 225; Fl. Mal. Pen. 5, 1925, 178. [T.: Setul: *Ridley* 14804 (K, SING)]. — *Fig. 5d.*

Perennial, with woody rhizome swollen at the nodes. *Stems* rather stout, erect, rigid, triquetrous, smooth or retrorsely scabrid on the angles, (30—) 70—100(—200) cm by up to 6 mm. *Leaves* subcoriaceous, rigid, linear, rather abruptly narrowed to the obtusish tip, all scattered or the middle ones more or less approximate and the upper ones remote, scabrous on the margins and the main nerves in the upper part, glabrous or sparsely hairy, $\frac{3}{4}$ — $1\frac{1}{2}$ cm wide; sheaths triquetrous, narrowly to broadly winged, glabrous, smooth or scabrid; contraligule rounded, with a scarious, elongate, lanceolate or oblong, glabrous, purplish, $1\frac{1}{2}$ cm long appendage, usually 2—3 times as long as wide. *Inflorescence* very variable in shape, consisting of 2—3 lateral partial panicles and a terminal one, often confluent into a pyramidal, very dense, compound panicle, or the lateral partial panicles remote to very remote, ovoid to very long and narrow, spike-like; peduncles hardly to much exerted from the sheaths; primary bracts similar to the leaves, overtopping the inflorescence, secondary ones setaceous, rigid, scabrous, ciliate at the broadened base, long-exserted from the panicles. *Spikelets* unisexual, 2—3 together, 4—5 mm long; male spikelets lanceolate; stamens 3; anthers linear, c. 2 mm long, with a subulate, scabrid, purplish appendage of the connective; female spikelets ovate, with a sterile lateral glume (the vestigial ♂ part of the spikelet). *Disk* 3-lobed; lobes appressed, triangular, obtuse, sometimes denticulate at the top, pale ferrugineous. *Nut* ovoid or subglobose, obsoletely trigonous, umbonulate, slightly reticulate to undulate-rugulose, hirtellous on the transverse netted lines, finally glabrescent, shining, white or pale grey, $2\frac{1}{3}$ — $2\frac{1}{2}$ mm diam.

Distribution: From Burma, Thailand, and Indo-China to S. China, the Solomon Islands, and tropical Australia; widely distributed in Malaysia, in Java only in the Western part, not known from the Lesser Sunda Islands, and in the Philippines only in Palawan and Busuanga.

Ecology: In primary and secondary forests, savannahs, wet places on road-sides, on beach-walls, etc., at low and medium altitudes, usually below 1000 m, in Celebes up to 1100 m (in Annam up to 1500 m).

Vernacular names: *Rumput sendayan bukit*, Mal., *ilat*, Sund., *rija-rija korisan*, Sum. E. C., *gegas*, Banka, *peridang*, Kutei, *wannensil*, *tabinsuroh*, *babandang*, N. Borneo.

SUMATRA and adjacent islands: *Bunnemeijer* 1353, 1652, 2347, 6217, 6275, 6397, 6433, 6461, 6549; *Dames* 12; *Koorders* 21503; *Kurz Cyp.* 4; *Meijer* 5729; *Palla s.n.*; *Rahmat si Boeea* 1989, 2118, 3091, 3844, 4177, 5523; *Rutten-Kooistra* 8; *Vorderman s.n.*

MALAY PENINSULA: *Alvins* 1225; *Burkill SF* 2835; *Burkill & Haniff SF* 15653; *Evans s.n.*; *Gaudichaud* 91 p.p.; *Griffith Kew Distr.* 6118, s.n.; *Henderson FMS* 10266, *FMS* 22969; *Holttum SF* 38289; *Hullett* 324, s.n.; *Hume* 7439; *Kloss s.n.*; *Lake & Kelsall s.n.*; *Lemann s.n.*; *Ridley* 160, 1556, s.n.; *Sinclair s.n.*; *Symington* 22992, 26971; *Vesterdal* 151.

W. JAVA: *Backer* 1994; *Bakhuizen van den Brink* 3049, 6968; *Boerlage s.n.*; *Broekhuysen* 20; *Buwalda* 2853; *Hildebrand s.n.*; *Koorders* 34552; *Ploem s.n.*; *van Steenis* 2205, 11183, 11784, 11785, 11786, 12680; *Zippel s.n.*; *Zollinger* 469b.

BORNEO: *Brooke* 8235; *Chaper s.n.*; *Clemens* 21361; *Creagh s.n.*; *Endert* 1571, 1737; *Gibbs* 2978; *Hombroon s.n.*; *Hose s.n.*; *Jaheri s.n.*; *Keith* 5976; *Meijer* 949 p.p.; *Motley* 54, 765; *Otik* 4245; *Polak* 272; *Teymann* 10933; *Hans Winkler* 50; *Yates* 65.

PHILIPPINES: *Merrill* 9202; *Ramos BS* 41175.

CELEBES: *Eyma* 1467 p.p., 3403; *Kjellberg* 542.

MOLUCCAS: *Boerlage* 35; *Labillardiere s.n.*; *Robinson Pl. Rumph.* 433; *d'Urville* 2; *de Wiljes Hissink* 20.

NEW GUINEA and adjacent islands: *Anang s.n.*; *Brass* 5808, 7670, 8252, 25994; *Branderhorst* 172; *Buwalda* 5392; *Dept. Agric. Rabaul W XII*; *Gjellerup* 87b; *Himson* 27; *Kalkman* 130 (= *BW* 3494); *Kanehira & Hatusima* 12964; *Mangold BW* 2199; *Meijer Drees* 96; *NGF* 2919; *Pleyte* 1138; *Womersley NGF* 3668; *van Zanten* 1007.

Notes. 1. Readily recognizable by the long, scarious appendage of the contraligule and the long-exserted, stiff secondary bracts, which give the inflorescence a somewhat prickly appearance. Otherwise very variable in habit and size, and closely related to *S. terrestris* (L.) Fass.

2. Typical *Scleria ciliaris* has open, often large, brown inflorescences with long and narrow, often spike-like lateral panicles, whereas *S. bancana* has more compact, often very dense, oblong, greenish inflorescences, in which the short lateral panicles are not rarely confluent with the terminal one. *Scleria ciliaris sensu stricto* occurs in S. China, Indo-China, and — less pronounced — in W. Java, *S. bancana* has a much wider distribution. The two do not exclude each other geographically. *Scleria malaccensis* is the same form as *S. bancana*. The characters for discrimination are feeble and there is a continuous series between the two extremes. Clarke (1894) distinguished between *S. ciliaris* (= *S. chinensis*) and *S. bancana* mainly by the wingless or very obscurely winged leaf-sheaths of the latter, but in otherwise typical *S. bancana* broadly winged sheaths are far from being rare. I agree with S. T. Blake (1954) that the two must be united; spikelets, stamens, fruits, etc. are exactly the same in both.

11. *Scleria pilorrhiza* C. B. Clarke, Fl. Br. Ind. 6, 1894, 691; J. Linn. Soc., Bot. 34, 1898, 101; Camus, Fl. Gén. I.-C. 7, 1912, 164. [T.: "a Calcutta communicata" (K)]. — *S. alta* (non Boeck.) Camus, Fl. Gén. I.-C. 7, 1912, 166. — *S. hebecarpa* (non Nees) Merr., En. Philip. 1, 1923, 133, p.p. (quoad BS 29679) — Fig. 5e.

Perennial, with creeping stolons clothed by lanceolate, striate, purplish sheaths. Stems slender, erect, triquetrous, scabrid to almost smooth, leafy throughout, (60—)90—150 cm by 2—4 mm. Leaves chartaceous, flat, rather gradually narrowed to the slender acute tip, or (when broad) premorse (see note 2), glabrous, retrorsely scabrid on the margins, very variable in width, (6—)10—25 mm wide; sheaths loose, triquetrous, broadly winged, the wings retrorsely scabrid on the edge; contraligule short, ovate or triangular, glabrous,

with narrow, cartilaginous, incrassate, yellowish margin, which is often scabrid on the edge. *Inflorescence* dense, narrow, consisting of a terminal panicle up to 10 cm long, and often 1—2 smaller lateral ones; panicles single at the nodes, erect, oblong, narrow because of the very short branches; peduncles erect, scabrid, the lowest sometimes up to 5 cm exerted from its sheath; clusters of spikelets close together; primary bracts similar to the leaves, erect, longer than the panicles in their axils but not or hardly overtopping the inflorescence; secondary bracts subulate, standing out from the panicle, often curved. *Spikelets* female (or bisexual) and male, 2—3 together, reddish brown; male spikelets shortly peduncled, lanceolate, 4—5 mm long; stamens 3; anthers linear, $1\frac{1}{2}$ —2 mm long; appendage of the connective conical-subulate, smooth, c. $\frac{1}{2}$ mm long; nut-bearing spikelets broadly ovoid, c. 5 mm long, with a sterile or male flower besides the female one. *Disk* triangular, reflexed, shallowly or hardly 3-lobed, lobes very obtuse. *Nut* large, ovoid or broadly ovoid, not or slightly overtopping the glumes, very obtusely trigonous, obtuse, not beaked, smooth, very shining, white, $3-3\frac{2}{3}$ by c. 3 mm.

Distribution: Very local and scattered, from India through Thailand, Cambodia, and Malaysia to N. Australia (near Darwin: *Allen 19, K*).

W. JAVA. Cheribon, forestry Indramaju, 20—30 m, along a ditch: *van Steenis 6671a* (BO, L).

PHILIPPINES. Luzon, prov. of Laguna, College Campus, along creek, 50 m: *Juliano s.n.* (MTJB); prov. of Rizal, Mt Lumutan: *Ramos & Edaño BS 29679* (K, NY, P).

Notes. 1. Close to *S. junghuhnii*, but readily recognizable by the presence of stolons, the stems not spongy at the base, the broadly winged sheaths, the narrow, spike-like, dense panicles, the long, setaceous ultimate bracts, the disk not surrounded by an elevation of the pericarp, the non-tubercled scar of the cupula, and the obtuse nut not, or hardly, overtopping the glumes.

2. This is the only Asian species sometimes clearly showing the curious character of 'premore' leaves. In such leaves (occurring in several African and American species) the lower part is broadened by a continuation of the wings of the leaf-sheath and shows 5 principal nerves. Towards the apex there is a sudden narrowing (usually at not quite opposite points of the margin). The distal part of the leaf is therefore much narrower than the proximal part, and has only 3 principal nerves. On the morphology and anatomy of this interesting type of leaves see Chermeson, *Rev. Gén. de Bot.* 38, 1926, 337—353.

3. Both in the Javan collection and the Philippine ones the disk is hardly lobed and very narrow, distinctly narrower than in the specimens from the Asiatic continent (see figs.), but otherwise they agree very well with the latter ones.

12. *Scleria junghuhniana* Boeck., *Linnaea* 38, 1874, 499. [T.: Central Java: *Junghuhn* (n.v.)]. — *Fig. 5f*.

Perennial with short woody rhizome and thick, dark red roots. *Stems* stout, erect, triquetrous; spongy towards the thickened base, leafy throughout, scabrid on the angles, up to 100 cm by 7 mm. *Leaves* herbaceous, flat, broadly linear, rather abruptly narrowed to the obtusish tip, glabrous, retrorsely scabrid on the margins, 7—13 mm wide; sheaths loose, triquetrous, not winged, scaberulous on the angles; contraligule short, broadly ovate, rounded, glabrous, with scarious, whitish margin. *Inflorescence* very loose, consisting of a terminal panicle and 2—3 distant lateral ones; panicles single at the nodes, compound, ovoid, c. 10

by 5—8 cm, branches obliquely patent, scabrid, spike-like, or with a few secondary branches 1—3 cm long; peduncles erect, long-exserted from the sheaths, compressed, scabrid; clusters of spikelets distant (1—2 cm spaced); primary bracts similar to the leaves, much longer than the panicles in their axils, but not overtopping the inflorescence; ultimate bracts very short, scale-like, shorter than to as long as the clusters of spikelets in their axils. *Spikelets* bisexual and male, 2—3 together, reddish brown; male spikelets lanceolate, 3 mm long, peduncled (peduncles c. 3 mm); stamens 3; anthers oblong-linear, c. 1 mm long; appendage of the connective conical-subulate, c. $\frac{1}{3}$ mm long, somewhat bristly at the top; nut-bearing spikelets broadly ovoid, 4 mm long, with 1—2 male flowers besides the female one; largest glume c. 3 mm long. *Disk* thick, triangular, narrow, reflexed, not lobed, brown, each side bordered by a low swelling of the pericarp; scar of the cupula with 3 depressed-conical tubercles. *Nut* large, much exserted from the glumes, ovoid, terete or obsoletely trigonous, acutish, not beaked, smooth, very shining, white, sometimes slightly discoloured, $3\frac{1}{3}$ — $3\frac{1}{2}$ by $2\frac{2}{3}$ mm.

W. JAVA. Cheribon. Forestry Indramaju, along ditch; a tall, robust species, very striking in the field, in the distance reminding one of *Coix* in fruit: *van Steenis* 6722 (BO, L).

Notes. 1. The distribution of this remarkable species is almost unknown. It has also been collected in Cambodia (forest of Pnom-penh: *d'Alleizette s.n.*, L), and Cochinchina (Prov. Bienhoa, marsh with wild rice, black basaltic soil: *Poillane* 21326, MTJB).

2. Boeckeler's type is from Central Java, res. Kedu, "in humidis planitie prope Awu-Awu." It got lost during the war. The *Scleria* specimen in the Leyden Herbarium thus labelled belongs to *S. terrestris* (L.) Fass.; it was cited by Miquel, Fl. Ind. Bat. 3, 1856, 342 under *S. scrobiculata*, and does not at all agree with Boeckeler's accurate description of *S. junghuhniana*, which undoubtedly refers to the species described above.

13. *Scleria poaeformis* Retz., Obs. 4, 1786, 13; Willd., Sp. Pl. 4, 1805, 316; Nees in Wight, Contr. 1834, 118; Kunth, En. 2, 1837, 358; Steud., Syn. 2, 1855, 179; Fischer, Kew Bull. 1931, 265; S. T. Blake, Proc. R. Soc. Queensl. 62, 1952, 89; J. Arn. Arb. 35, 1954, 231; Nelmes, Kew Bull. 1956, 110. [T.: India Or.: *Koenig* (LD; in L probably a duplicate)]. — *S. oryzoides* Presl, Rel. Haenk. 1, 1828, 201; Nees in Wight, Contr. 1834, 116; Kunth, En. 2, 1837, 356; Steud., Syn. 2, 1855, 169; Miq., Fl. Ind. Bat. 3, 1856, 342; Thwaites, En. Pl. Zeyl. 1864, 353; Boeck., Linnaea 38, 1874, 492 ('*orizoides*'); Benth., Fl. Austr. 7, 1878, 432; F.-Vill., Nov. App. 1882, 310; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18; Clarke, Fl. Br. Ind. 6, 1894, 691; J. Linn. Soc., Bot. 34, 1898, 101; Philip. J. Sc. 2, 1907, Bot. 105; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 110; J. Str. Br. R. As. Soc. no 59, 1911, 225; Camus, Fl. Gén. I.-C. 7, 1912, 164; Merr., En. Born. 1921, 67; En. Philip. 1, 1923, 134; Ridl., Fl. Mal. Pen. 5, 1925, 177; Van Steenis, Bull. Jard. Bot. Btzg III, 17, 1948, 399; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 57. [T.: Luzon: *Haenke* (dupl. in K)]. — *Fig. 5 g.*

Stout, glabrous perennial with thick, horizontally creeping rhizome. *Stems* rather distant, robust, erect, triquetrous with more or less concave sides, smooth or scabrid on the angles at the top, often rooting from the lower nodes, 1—2 m

by up to 1 cm (at the base sometimes up to 2 cm thick). *Leaves* mainly basal and subbasal (1—3 higher on the stem), coriaceous, flat or canaliculate, exactly linear, rather abruptly narrowed at the obtusish, somewhat cucullate tip, septate-nodulose, smooth, or scabrid on the margins and the 3 prominent nerves, up to 25 mm wide, the upper ones shorter and narrower; upper sheaths acutely triquetrous or narrowly winged, smooth or scabrid on the angles, mouth concave or truncate on the ventral side, with narrow scarious margin; lower sheaths spongy, purplish red. *Inflorescence* as a rule a single terminal, compound, rather dense, long-peduncled panicle with a small setaceous bract at the base, or ebracteate, ovate or elliptic in outline, 10—20 by 5—10 cm, very rarely a lateral panicle in the axil of a leafy bract added; ultimate branches obliquely erect, spiciform, with scabrid axis. *Spikelets* solitary, sessile, evenly distributed along the spiciform branches, usually unisexual; male spikelets numerous, 4—5 mm long; stamens 3, anthers linear, c. $1\frac{1}{2}$ mm long, with a distinct, conical-subulate, purplish appendage of the connective; nut-bearing spikelets few, mostly restricted to the base of the branches, 4—5 mm long, their male part reduced to a sterile glume or to 1—2 flowers (often with 2 stamens); glumes ovate, acute, muticous. *Disk* small, much narrower than the base of the nut, thick, triangular-cordate (emarginate on one side only), appressed to the nut. *Nut* about as long as the glumes, obtusely trigonous to almost terete, ovoid, ellipsoid, or subglobose, not or scarcely apiculate, with 3 depressions at the base, smooth and glabrous, very shining, white, $2\frac{1}{8}$ —3 by $2\frac{1}{2}$ —3 mm.

Distribution: Africa (Zanzibar, Mozambique); from Ceylon and SE. India through Thailand and Indo-China to Hainan, and through Malaysia to tropical Australia (N. Territory and N. Queensland); widely spread in Malaysia, but very local: Sumatra (Atjeh, Palembang), Malay Peninsula (Perlis, Kedah, Perak, Trengganu, Malacca, Johore, Singapore), W. Java, Borneo, Philippines (Luzon, Palawan), SE. Celebes, New Guinea (Papua), Aru Islands. The specimens labelled "Sumbawa, leg. *Ploem*" (L) have certainly been mislabelled.

Ecology: In fresh-water swamps, swampy savannah-forests, fallow rice-fields, along ditches, at low altitudes, in Atjeh up to c. 1000 m. Often forming dense, pure stands.

Use: In W. Java the leaves are sometimes used for making mats.

Vernacular names: N. Sumatra: *benjén*; Mal. Pen.: *rumput siku dana*, *purun tikus*, *perau*; W. Java: *wlingi* (Sund.); Borneo: *kara* (Dusun), *bundung* (Bajau); Philippines: *agdas* (Bik.).

SUMATRA. Atjeh. Gajolands, Sangir valley, above Blang Kedjeren: *van Steenis* 9835 (BO, K, L); Gajo and Alas Lands: *Pringo Atmodjo* 234, 274 (L). Palembang. Pladju: *Rutten-Kooistra* 14 (BO, L).

MALAY PENINSULA. Kedah: *Vesterdal* 461 (C); Alor Sta: *Ridley* 14803 (K, SING); near Godiang: *Symington* 57047 (KEP). Perak. Trang: *Kunstler* 1413 (L). Trengganu. Besut: *Sinclair & Kiah* SF 40784 (SING). Malacca: *Alvins* 25 (SING); *Gaudichaud* 90 (P); *Griffith, Kew Distr.* 6130 (K), s.n. (CGE); Batu Berendam: *Burkill* 1363 (SING); *Sinclair* SF 40545 (BM, K, L, SING); Fish Culture Research Station: *Mohd Shah* 40 (K, L, SING). Johore. Sungei Rhu Reba, Jason Bay: *Corner* SF 28507 (BO, K, SING); Serom: *Ridley* 10998 (K, SING). Singapore: *Hullett* s.n. (K); *Ridley* 5808 (BM, SING).

W. JAVA. Pen-gallan: *Horsfield* 628 (BM); near Batavia: *Kuhl & van Hasselt* s.n. (L); Tjilintjing: *Olivier* 3 (BO); between Krاندji and Bekasi, Rawah Tembaga: *van der Meer & den Hoed* 1468 A (L); *van Steenis* 1244 (K, L, SING), 12544 (BO, SING).

BORNEO. *Korthals* s.n. (L). North Borneo. Jesselton: *Clemens* 9691 (BO, K),

Topping 1920 (NY); Lota Belud: *Keith* 6785 (K, SING). Southeast Borneo. Banjarmasin: *Motley* 1296 (CGE); Bati-Bati: *Miki* 11 (BO).

PHILIPPINES. Luzon: *Haenke* s.n. (K); Isabela: *Merrill* 144 (BO, K). Palawan: *Merrill Phil. Pl.* 1294 (BM, BO, L, NY, P, SING).

SE. CELEBES. Rumbia, Wambakowu: *Elbert* 3095 (L); Lasao: *Kjellberg* 1181 (BO).

NEW GUINEA. Papua. W. Div., Wuroi, Oriomo R.: *Brass* 5748 (BO, L, NY); Daru Island: *Brass* 6338 (BM, BO, K, U); Lake Daviumbu, Middle Fly R.: *Brass* 7855 (BM, BO, U); Gaima, Lower Fly R.: *Brass* 8261 (BM, BO, U). Aru Islands. P. Trangan: *Buwalda* 5498 (BO, K, L, SING).

THE SPECIES WITH 'WHORLED' LEAVES (Nos 14—17)

The group of *Sclerias* in which the normally developed internodes of the flowering stems alternate with some much shortened ones, and in which consequently the middle leaves are spuriously opposite or whorled is easily recognizable, but extremely difficult to split up.

The best characterized species of the group is certainly *S. sumatrensis*, which is already perfectly distinct by the peculiar shape of the tall disk. Though the characters of the Western *S. purpurascens* and the Eastern *S. polycarpa* are less pronounced, these species can satisfactorily be distinguished. After these three have been segregated, there still remains a large number of specimens which I am unable to arrange in natural groups. In the present paper they are united under the binomial *Scleria scrobiculata* Nees. For the majority of these specimens the large, ovoid, scrobiculate, white nut is characteristic, but in a few collections the ripe nuts are perfectly smooth. This is for instance the case in *Hoogland* 3363 (*Fig. 6 c*) and *Schram BW* 7738, from Papua and W. New Guinea respectively, also remarkable by their 2 cm broad leaves, with 1 cm broad, reddish wings of the sheaths. They probably represent a special race.

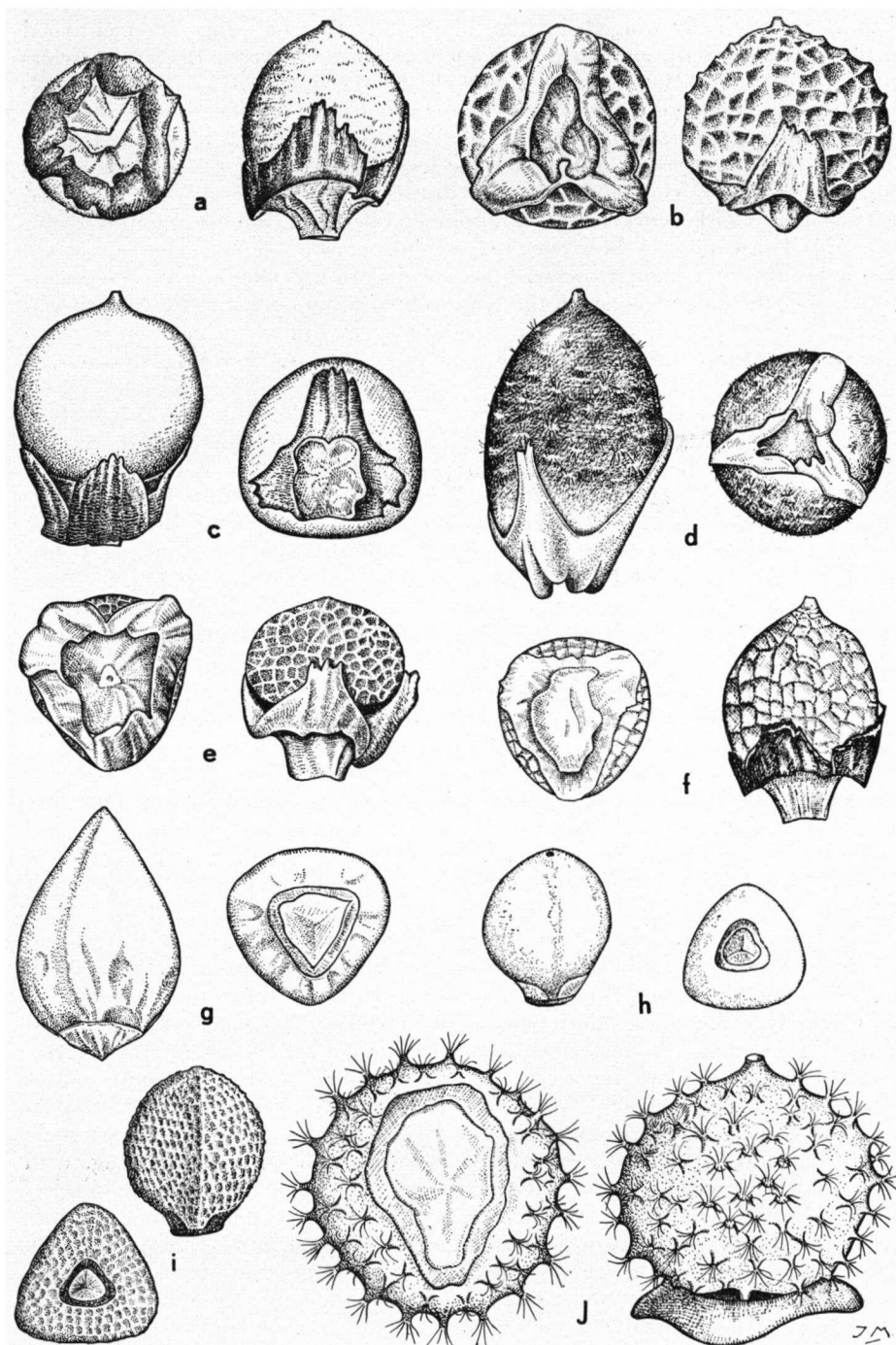
A narrow-leaved, very slender form, with obsoletely scrobiculate nuts and broad lobes of the hypogynous disk is represented by *Brass* 6244 from Daru Island, and *Koch, herb. Lugd. Bat.* 909.89-44 from W. New Guinea.

Most remarkable is *Brass* 27949 from Sudest Island (*Fig. 6 d*). It may not belong to *S. scrobiculata*. The nuts are ellipsoid, 3—3 1/2 mm long and 2 1/3 mm wide, slightly rugulose, vividly violet, and the lobes of the yellow disk lanceolate, much narrower and longer than in typical *S. scrobiculata*.

Apparently the variability is much greater in New Guinea than elsewhere in the Malaysian area. Unfortunately all the aberrant forms mentioned are represented in the herbaria by one or two collections only, so that it would be premature to describe them as special races. A subspecies with small, much depressed nuts has been collected several times and is described below.

Both in *S. purpurascens* and *S. polycarpa* the leaf-sheaths are wingless. In *S. scrobiculata* they may be wingless or narrowly to broadly winged. The species was based on two collections, from Manila, leg. *Meyen* and from Rawak, leg. *Gaudichaud*. I have not seen the former collection; in the latter the

Fig. 6. Nuts and disks of: a. *Scleria polycarpa* Boeck.; b. *S. scrobiculata* Nees; c. *ditto* (*Hoogland* 3363); d. *S. cf. scrobiculata* Nees (*Brass* 27949); e. *S. scrobiculata* Nees ssp. *discoarpa* Kern; f. *S. purpurascens* Steud.; g. *S. corymbosa* Roxb.; h. *S. lithosperma* (L.) Sw. var. *lithosperma*; i. *S. lithosperma* (L.) Sw. var. *linearis* Benth.; j. *S. carphiformis* Ridl. — a—i $\times 10$; j $\times 20$.



sheaths are distinctly winged, in spite of the fact that no wings are mentioned in the original description. In a subsequent publication Nees (1843) also refers his *S. timorensis* to *S. scrobiculata*. In all the specimens of Leschenault's collection from Timor, on which *S. timorensis* was based, the sheaths are wingless.

Scleria purpureovaginata Boeck., Bot. Jahrb. 5, 1884, 513, was treated by Clarke (1907, p. 105) as a separate species, related to the other species with falsely opposite or whorled leaves, but distinguished by the strongly 3-winged leaf-sheaths. Clarke cites several Philippine collections, among them *Wichura 1852 bis*. This cannot be Boeckeler's type-collection, as *Scleria purpureovaginata* was described as having narrow, wingless sheaths. In my opinion it is even doubtful whether the name belongs in the synonymy of *S. scrobiculata*, to which it was referred by S. T. Blake (1954). In Boeckeler's description no mention is made of whorled leaves, and the species is said to be near to *S. elata* Thwaites.

14. *Scleria sumatrensis* Retz., Obs. 5, 1789, 19, t. 2; Willd., Sp. Pl. 4, 1805, 315; Nees in Wight, Contr. 1834, 116; Kunth, En. 2, 1837, 357; Steud., Syn. 2, 1855, 171; Miq., Sum. 1861, 262, 602; Thwaites, En. Pl. Zeyl. 1864, 353; Boeck., Linnaea 38, 1874, 513; Rolfe, J. Bot. 1885, 216; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18; Clarke, Fl. Br. Ind. 6, 1894, 693; J. Linn. Soc., Bot. 34, 1898, 103; Usteri, Beitr. Kenntn. Philip. Veg. 1905, 132; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 228; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 113; Clarke, Philip. J. Sc. 2, 1907, Bot. 106; Ill. Cyp. 1909, t. 129 f. 1—2; Camus, Fl. Gén. I.-C. 7, 1912, 170, f. 21, 9; Merr., En. Born. 1921, 67; En. Philip. 1, 1923, 135; Ridl., Fl. Mal. Pen. 5, 1925, 179; H. Pfeiff., Mitt. Inst. Allg. Bot. Hamb. 7, 1928, 174, f. 6; Ohwi, Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 5; Utt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 54; S. T. Blake, Proc. R. Soc. Queensl. 62, 1952, 88. [T.: Sumatra: *Wennerberg*]. — Fig. 5 h.

Perennial, with thick, woody, nodose rhizome. *Stems* robust, erect or scrambling over bushes, triquetrous, glabrous, smooth or slightly scabrid, up to 4 m tall by up to 8 mm thick. *Leaves* in the middle part of the stems (and lower bracts) clustered in pseudo-whorls of 3—5, rigid, patent, gradually narrowed upwards, scabrous on the margins and the main nerves in the upper part, glabrous or puberulous at the base, with revolute margins, up to 13 mm wide, lower ones very short; sheaths narrow, glabrous or puberulous, triquetrous, wingless to rather broadly winged, brown at the base; contraligule very short, broadly rounded, ciliate. *Inflorescence* oblong, erect, decompound, usually very dense, rarely rather loose, the terminal panicle up to 25 cm long, the lateral ones 2—3 together, on long, erect peduncles, pyramidal; branches stiff, patent, winged-angular, rhachis smooth or scabrid; primary bracts foliaceous, shorter than to about as long as the inflorescence, secondary ones setaceous. *Spikelets* in clusters of 2—3, unisexual, light or reddish brown, 4—5 mm long; male spikelets peduncled, lanceolate; stamens 3; anthers linear, c. 2 mm long, with long, conical, somewhat bristly appendage of the connective; female spikelets ovate, rounded at the base, the male part reduced to a sterile glume; glumes ovate or broadly ovate, very acute, stramineous to purplish, with green keel. Cupula large and thick, c. 2 mm broad. *Disk* very large, cyathiform, coriaceous, $\frac{1}{2}$ — $\frac{3}{4}$ as high as the nut (sometimes almost completely enveloping it), $1\frac{1}{2}$ —2 mm high, strongly longitudinally plicate, halfway or less 3-lobed, at first yellowish, finally red; lobes broadened upwards, very obtuse, denticulate-

crenulate, their margins contiguous or somewhat overlapping. *Nut* slightly shorter than the glumes, depressed-globose, terete, umbonulate, sparsely pilose, glabrescent, cancellate, shining, olivaceous-brown to greyish black, c. 2 mm diam.

Distribution: Widely spread from Ceylon and India to Formosa, Indo-China, and Queensland; in Malaysia: Sumatra and adjacent islands, Malay Peninsula, W. Java, E. Java (Djatiroto, Puger), Borneo, Celebes (Kolonedale), Philippines (Palawan, Mindanao, Basilan, Leyte).

Ecology: In dry, open places, thickets and forests, but also in swamps and swampy forests, at low altitudes (up to 500 m); often dominant.

Vernacular names: *Rija-rija*, *si anit*, Sum.; *rumput kumba*, *r. siamet*, *sendayan*, *rumput sesayah gajah*, Mal. Pen.; *tali juru*, *rambang*, *kares-kares*, *keris-keris*, *kerisan*, *sampa hiering*, *perèdang*, Borneo; Philip.: *balbalili*, Bon., *bulálo*, Sub., *pangpayung*, C. Bis.

SUMATRA and adjacent islands: *Asdat* 9; *Bartlett* 6426, 7249; *Bruinier* 62; *Bünnemeijer* 6142, 7276, 7450, 7503, 7614, 7883; *Hagerup* s.n.; *Iboet* 52; *Koorders* 21535; *Kurz* s.n.; *Lörzing* 3357; *Lütjeharms* 5230; *Meijer* 5238, 5732, 6686; *Polak* 151; *Praetorius* s.n.; *Rahmat si Boeoa* 4282, 5071, 8268; *Rappard* 88; *Riedel* s.n.; *Ruttner* 148.

MALAY PENINSULA: *Alvins* 1638; *Burkill & Haniff* SF 13152; *Cantley's coll.* 2607, 3120; *Griffith Kew Distr.* 6133; *Henderson* SF 10298, SF 10348; *Holtum* 9228, SF 19899, SF 24661, SF 38290; *Hullett* s.n.; *Hume* 8233; *King's coll.* 2045; *Lemann* s.n.; *Mohd Nur* SF 34071; *Mohd Shah* 136; *Nauen* SF 38011, SF 38177; *Ridley* 25, s.n.; *Rostado* s.n.; *Sinclair* s.n.; *Spare* SF 36002; *Symington* 20530; *G. Thomson* s.n.; *Wallich* 3407 p.p.; *Wilkes* s.n.

JAVA: *Horsfield* s.n.; *Zippel* s.n. West: *Backer* 30812; *Endert* E 1188; *Kern & Meijer* 1149; *Polak* s.n.; *van Slooten* 578; *van Steenis* 3091. East: *Backer* 7894; *Koorders* 20972, 21221.

BORNEO: *Amdjah* 838; *Anthony* A 730; *Baker* s.n.; *Beccari* PB 51; *Bianchi* 53; *Brooke* 10630; *Buwalda* 7711, 7884; *Clemens* 21362, 21364, 21365 p.p., 21854; *Creagh* s.n.; *Elmer* 20721; *Endert* 1458; *Franck* 263, 994; *Kadir* 938, A 2010, A 2098, A 2649, A 2717, A 3563; *Keith* 8863; *Kondo & Edaño* PNH 38731; *Meijer* 949 p.p., 2307a; *Mohd Dachlan* 11; *Mohd Enoh* 268; *Native coll.* 1287, 1664; *Polak* 193, 428, 467a; *Pursegloue & Shah* P 4595; *Symington* 48500; *Teysmann* 10936, 10942, 10950.

PHILIPPINES: *Clemens* 1116; *de Vore & Hoover* 7; *Frohne* PNH 35703; *Merrill* 9750; *Reillo* BS 16349; *Santos* 5043.

CELEBES: *Eyma* 3998.

15. *Scleria polycarpa* Boeck., *Linnaea* 38, 1874, 509; S. T. Blake, J. Arn. Arb. 35, 1954, 230. [T.: Ins. Fichi, ex herb. Hooker (dupl. in K)]. — *S. margaritifera* Willd., Sp. Pl. 4, 1805, 312; Boeck., *Linnaea* 38, 1874, 511; Benth., Fl. Austr. 7, 1878, 430; Rendle in Gibbs, Arfak 1917, 200, non Gaertn. (1788). [T.: in insula Tanna, *Forster*]. — *S. graeffeana* Boeck., *Flora* 58, 1875, 121; Benth., Fl. Austr. 7, 1878, 431, p.p.; K. Schum., Bot. Jahrb. 13, 1891, 266; Valck. Sur., Nova Guinea 8, 1912, 712; Palla in Rech., Denkschr. K. Ak. Wiss. M.-N. Kl. Wien 89, 1913, 500. [T.: Nova Holland., Port Mackay: *Am. Dietrich* 643 (BM, HBG); Samoa-insulae: *Graeffe* (dupl. in K)]. — *S. levis* f. *villosa* Valck. Sur., Nova Guinea 8, 1912, 712; Kük., Bot. Jahrb. 59, 1924, 58; ?Ohwi, Bot. Mag. Tokyo 56, 1942, 212. [T.: Ins. Neu-Pommern: *Peekel* 29, 30 (BO)]. — *S. ternifolia* Domin, Bibl. Bot., Heft 85, 1915, 490, ex descr. [T.: NE. Queensland, Harveys Creek: *Domin* (n.v.)]. — *S. scrobiculata* (non Nees) Schum. & Laut., Fl. Schutzgeb. 1900, 198, p.p.; Kük., Bot. Jahrb. 59, 1924, 58, p.p.; Ohwi, Bot. Mag. Tokyo 56, 1942, 212. — Fig. 6a.

Perennial with thick, shortly creeping, woody rhizome. *Stems* erect, rigid, triquetrous, scabrid on the angles, glabrous or short-pubescent, often with

asperous sides, many-leaved, up to 120 cm by 3—6 mm. *Leaves* in the middle part of the stem clustered, in pseudo-whorls of 2—5, rigid, coriaceous, patent, gradually narrowed upwards, flat or with recurved margins, acute, scabrid on the margins, more or less asperous above, glabrous or pubescent beneath, 5—10 mm wide; sheaths glabrous or pubescent, triquetrous, not winged; contraligule short, broadly rounded, hirsute-ciliate. *Inflorescence* narrow, dense or rather dense, 20—50 cm long, consisting of a terminal panicle and up to 7 lateral ones; rachis scabrid or smooth; panicles erect, oblong, single or binate at the nodes, 7—10 cm long, with obliquely erect, almost spiciform, short branches; primary bracts leafy, secondary ones inconspicuous, setaceous, ciliate at the dilated base, shorter than the branchlets in their axils. *Spikelets* 2—3 together, unisexual; male spikelets narrowly lanceolate, c. 3 mm long; female spikelets evenly distributed along the branchlets and throughout the panicles, numerous, sub-orbicular, rounded at the base, c. 4 mm long; stamens 3; anthers linear, c. 1 mm long, with long, conical purplish appendage of the connective. *Disk* large, coriaceous, less deeply 3-lobed than in *S. scrobiculata* and *S. purpurascens*, shining, bright yellow or reddish; lobes broadly triangular, very obtuse, prominently denticulate, appressed. *Nut* exserted from the glumes, globose, hardly or not umbonulate, almost smooth to slightly rugulose, hirtellous, white or (frequently) more or less tinged with blue, with purplish style-scar, 2—2½ mm long and wide.

Distribution: From tropical Australia (N. Territory, Queensland) through Melanesia to Fiji, Samoa, and Tonga Islands; in Malaysia: Moluccas (Halmahera, Ceram), New Guinea, and adjacent islands.

Ecology: In rain-forests, swamp-forests, forest-borders, on banks of streams, also in coast-vegetation, at low altitudes, rarely up to 1200 m.

Vernacular names: *Sáta*, Ceram; *simbora*, Orokawa lang., Mumuni.

MOLUCCAS. Halmahera: *Anang* 457 (BO, L). Ceram: *Buwalda* 5987 (BO, K, L); *Kornassi* 445 (BO, K, L, U).

NEW GUINEA. W. New Guinea. Sorong: *Djamhari* 350 (BO, L), 575 (BO, K, L, SING); *Hellendoorn* 65 (L); *van Royen* 3196 (L); Manokuari: *Gibbs* 6166 (BM); *Janowsky* 500 (BO, K, L, SING); island of Roon: *Gibbs* 6239 (BM, K); Waren, 60 miles S of Manokuari: *Kanehira & Hatusima* 13129 (BO); Beriat, 12 km S of Teminabuan: *Kalkman BW* 6285 (L); Tarera nr Uta: *Aet* 574 (BO, K, L, SING); bank of Otken River: *Lam* 479 (BO, K, L); Van Gelder River: *Docters van Leeuwen* 9318 (BO, L). Territory of New Guinea. Sepik Distr., Angoram: *Womersley NGF* 3660 (L); Lae: *Henty NGF* 11577 (L); Augusta R.: *Hollrung* 875 (P); *Schlechter* 18406 (L, P). Papua. N. Div., between Ambasi and Devatutu villages: *Hoogland* 3408 (K, L); W. Div., Lower Fly R.: *Brass* 8115 (U); Centr. Div., Kubuna: *Brass* 5563 (L); E. Div., Fife Bay: *Turner* 95 (BM); Huon Gulf: *Lauterbach* 1185 (BO, L, SING); Cape Vogel: *Saunders* 109 (BM, L); *Hoogland* 4747 (BM, BO, K, L). New Britain: *Floyd* 3477 (K, L); *Peekel* 29, 30 (BO). Misima Isl.: *Brass* 27650 (BO, K, L). Rossel Isl.: *Brass* 28306 (K, L). Sudest Isl.: *Brass* 27734 (K, L). Jappen-Biak. Wandesi nr Serui: *Aet & Idjan* 604 (BO, L). Lawak (= Rawak): *Gaudichaud s.n.* (P). Misool. Solal: *Pleyte* 1139 (BO, L, SING).

16. *Scleria scrobiculata* Nees & Mey. ex Nees in Wight, Contr. 1834, 117; Kunth, En. 2, 1837, 342; Nees, Nov. Act. Ac. Caes. Leop.-Car. 19, Suppl. 1, 1843, 119; Mor., Syst. Verz. 1846, 98, p.p. (quoad *Zollinger* 470); Steud., Syn. 2, 1855, 169; Miq., Fl. Ind. Bat. 3, 1856, 342, p.p. (excl. specim. Junghuhn.); Boeck., Linnaea 38, 1874, 508; F.-Vill., Nov. App. 1882, 310; K. Sch. & Laut., Fl. Schutzgeb. 1900, 198, saltem p.p.; Clarke, J. Linn. Soc., Bot. 36, 1903, 266;

Philip. J. Sc. 2, 1907; Bot. 106; Valck. Sur., Nova Guinea 8, 1912, 712; Merr., Sp. Blanc. 1918, 83; En. Philip. 1, 1923, 135; Kük., Bot. Jahrb. 59, 1924, 58, p.p.; Elm., Leaf. Philip. Bot. 10, 1938, 3546; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 55; S. T. Blake, J. Arn. Arb. 35, 1954, 229. [T.: Manila: *Meyen*; Rawak: *Gaudichaud* (FI, P)]. — *S. trialata* (non Poir.) Brongn. in Duperrey, Voy., Bot., 1834, 165 (Amboine et Rawak: *d'Urville & Gaudichaud*, P). — *S. tessellata* (non Willd.) Decne, Nouv. Ann. Mus. Hist. Nat. 3, 1834, 362; Herb. Tim. Descr. 1835, 34. — *S. timorensis* Nees, Linnaea 9, 1835, 303, nom. nud. [T.: Timor: *Leschenault* (C, CGE, K, L, NY, P)]. — *S. foveolata* (non Cav.) Llanos, Frag. Pl. Filip. 1851, 103; F.-Vill. & Naves in Blanco, Fl. Filip. ed. 3, 4¹, 1880, 79. — *S. keyensis* K. Schum. in Warb., Bot. Jahrb. 13, 1890, 267, ex descr.; Valck. Sur., Nova Guinea 8, 1912, 713. [T.: Key Isl.: *Warburg* (n.v.)]. — *S. purpureovaginata* (an Boeck.?) Clarke, Philip. J. Sc. 2, 1907, Bot. 105; Merr., En. Born. 1921, 67. — *S. multifoliata* (non Boeck.) Clarke, Philip. J. Sc. 2, 1907, 106, p.p. (quoad *Topping* 460). — *S. elata* (non Thwaites) Lam, Nat. Tijd. N.I. 88, 1928, 194.

ssp. scrobiculata — Fig. 6 b.

Perennial with thick, shortly creeping, woody rhizome. *Stems* usually robust, erect, triquetrous, glabrous, scabrid on the angles, many-leaved, up to 2½ m tall and 4–10 mm thick. *Leaves* in the middle part of the stems clustered, in pseudo-whorls of 2–5, rigid, patent, gradually narrowed upwards, scabrid on the margins and the main nerves, glabrous, 4–20 mm wide; sheaths glabrous, triquetrous, wingless or winged (wings up to 1 cm wide, often protracted at the top into an up to 1 cm long auricle), green or purplish; contraligule short, broadly rounded, hirsute-ciliate. *Inflorescence* broad, up to 70 cm long, rather loose to dense, consisting of a large, broadly pyramidal terminal panicle and up to 7, single or binate lateral ones on erect, sometimes very long peduncles; branches patent, rhachis scabrid; ultimate bracts conspicuous, stiff, ciliate at the dilated base, more or less exserted from the panicle. *Spikelets* 2–3 together, unisexual; male spikelets peduncled, lanceolate, 3–4 mm long; female ones at the base of the branchlets, ovoid, rounded at the base, 4 mm long; stamens 3; anthers 1–1½ mm long, with long-conical, somewhat bristly appendage of the connective. *Disk* 3-lobed, triangular, thick, glabrous, yellowish; lobes triangular, obtuse, c. ⅓ as high as the nut, 1–1¼ mm long, denticulate at the top. *Nut* rather large, exserted from the glumes, ovoid or broadly ovoid, umbonate, scrobiculate, rarely smooth, hirtellous on the raised walls, glabrescent, white, 2½–3 by 2½–2⅔ mm.

Distribution: Thailand, Indo-China, Andamans, through Malaysia to Palau Islands and Samoa; in Malaysia: once collected in the Malay Peninsula (Johore); very rare in Sumatra, Java, and Borneo; common in the Philippines and the Lesser Sunda Islands, and probably not rare in Celebes, the Moluccas, and New Guinea.

Ecology: In damp shaded localities: thickets, forests, forest-borders, old clearings, etc., usually at low altitudes, rarely up to 1250 (1800?) m.

Vernacular names: *Ilal*, Sund., *badingan*, *kerissan*, Jav., *kupukuë*, Flores, *tentariṗa*, Talaud, *eri*, Halmahera, *riap*, *intariṗ*, *rumpuṗ piso*, Minahassa; Philippines: *agagidán*, Bon., *aladán*, *amamgid*, *tangra*, Ilk., *amgid*, *árat*, *dáat*,

dáut, katábad, ulat, Tag., *árat, dat*, Pamp., *dáhat, Bik, dat, haras*, P. Bis., *gáat, mangked*, Iv., *ulat*, Pang., *telaíd*, Sub.; the Philippine names refer also to *S. purpurascens*.

SUMATRA. Serdang: Lörzing 9109. Batu Islands: Raap 378.

MALAY PENINSULA. Johore, Segamat: Holtum SF 38305.

JAVA and adjacent islands: Backer 27416, 31800; Beumée 6733; van Borssum Waalkes 672; Brinkman 582; Buysman 244; Docters van Leeuwen 5204; Dorgelo 83, 1749; Horsfield s.n.; Kievits 1749; Koorders 21165; Kostermans & van Woerden 102; Labillardière s.n.; Leschenault s.n.; Mousset 569; Ploem 6483; van Straelen 17; Zollinger 470.

LESSER SUNDA ISLANDS: Bloembergen 3680; Buwalda 4795; de Castro LXXI; Colfs 313; Iboet 470; Jaag 1549; Leschenault s.n.; Monod de Froideville 1937; Sarip 121; Soehanda 101; de Voogd 2529.

BORNEO and adjacent islands: Cuadra A 3087; Gibbs 2665; van Steenis 745 p.p., 990.

PHILIPPINES: Ahern's coll. 3313; Barthe s.n.; Bermejós 353; Borden FB 1929; Clemens 144, 1854, 18013; Copeland 95, 591; Cumíng s.n.; Ebaló 1083; Edaño PNH 11916, PNH 17924; Elmer 5538, 6677, 8123, 12717, 16088; Fénix BS 3747, BS 3950, BS 12640, BS 24958; Fox PNH 8967; Foxworthy BS 24, BS 853; Frake PNH 35961; Gachalian PNH 33585; Gaudichaud 83; Hallier 4042; Herre 1158; King, herb. Hance 8973; Lohér 809, 810; MacGregor 119, BS 1742; Marche B 69; Mendoza PNH 18442; Merrill 91, 528, 550, Sp. Blanc. 680, 1253, 7299, 8113; Otones BS 17992; Perrottet s.n.; Ramos Phil. Pl. 1455, BS 26971, BS 27229, BS 76840, BS 80081; Ramos & Derooy BS 22531; Ramos & Edaño BS 31169, BS 44329, BS 46803, BS 47190, BS 48126, BS 49189; Santos 4071, 4709, 4982, 5182; Sulit PNH 11806; Topping 458, 460; Vidal 1936; Wenzel 1691; Whitford 34; Williams 1.

CELEBES and adjacent islands: Bünnemeijer 10836; Docters van Leeuwen 1504, 1854; Elbert 3430; Eyma 4062; van der Gaag 70; Kaudern 115, 413; Koorders 16659, 16673, 16675, 16676, 16684, 16685, 16692; Rachmat 51; Reyne s.n.; de la Savinière 175; van Steenis 10358; Teysmann 11847, 13820, 14167.

MOLUCCAS: Anang 55, 167, 505; Atje 15; Barclay s.n.; Beguin 887, 1787; Bloembergen 4436; Boerlage 30, 72, 199; Forsten s.n.; Jensen 157; Kostermans 906, 957; Labillardière s.n.; Lam 2520, 3152; Pleyte 62; Saanan 102; Treub 387; d'Urville s.n.

NEW GUINEA and adjacent islands: Brass 5322, 6244, 7590, 7715, 727949 (see p. 180); Buwalda 5494; Carr 11319; Gaudichaud (A1) 36, s.n.; Hoogland 3363 (BO, K, L); Koch L. B. 909.89-44; Lam 836; Lauterbach 513; Ledermann 6861; Pleyte 910; Schram BW 7738; d'Urville 1.

16a. ssp. *discocarpa* Kern, subspec. nov. — Fig. 6e.

Nux parva, glumis brevior, valde depresso-globosa, haud vel vix umbonata, laevis vel leviter reticulata, lactea, 1½ mm longa, 2—2½ mm lata; discus luteus, nuce aequilatus. Culmi leaves; folia glabra, apice scabrida, caeterum leaves vel marginibus scabridis, vaginis glabris laevibusque, distincte alatis. Spiculae femineae late ovatae, basi late rotundatae, 3 mm longae et latae. Inflorescentia laxa, ampla, 50—70 cm longa.

Type: New Guinea: Docters van Leeuwen 11153 (L).

NEW GUINEA. W. New Guinea. Mamberamo River, Pioneer bivouac, in water: Chr. Versteegh 48 (BO, K, L); Van Rees-Gauttier mountains, water-side, on alluvial river-clay: Feuilletau de Bruyn 201 (BO, L); Meervlakte, Motorbivouac, bank of Bruine Rivier, alt. 100 m: Docters van Leeuwen 11153 (BO, SING, L). NE. New Guinea. Sepik Distr.: Ledermann 6782 (SING). Papua. Fly River: d'Albertis in 1876 (FI).

The following collections may also belong here, but they are only in young flowers.

MOLUCCAS. Halmahera. Telago Rano: Idjan & Mochtar 261 (BO, L). Ceram. Telaga Sawan, near Wae Samae: Eyma 2934 (BO, L).

NEW GUINEA. Papua. Lake Daviumbu, Middle Fly River, savannahs, on swamp margins: Brass 7663 (BO), 7715 (BO, U).

Note. Very striking by the perfectly smooth stems and sheaths, the slender inflorescence, the broad female spikelets, and the minute, much depressed nuts. As in the following collections either the nut is less depressed or the inflorescence stiffer, it seems appropriate to treat this taxon as a subspecies of *S. scrobiculata*.

NEW GUINEA. W. New Guinea. Bernhard bivouac, temporarily flooded clayish soil, alt. 50 m: *Meijer Drees* 360 (BO). **PAPUA.** Lake Daviumbu, Middle Fly River, forming dense thickets 2½—3 m high in edge of forest along lake-shore: *Brass* 7590 (BO, U).

17. *Scleria purpurascens* Steud., Syn. 2, 1855, 169; Miq., Fl. Ind. Bat. 3, 1856, 342; F.-Vill., Nov. App. 1882, 310. [T.: Java: *Goering* 167 (P)]. — *S. scrobiculata* (non Nees) Mor., Syst. Verz. 1846, 98, p.p. (quoad *Zollinger* 377). — *S. pubescens* Zoll., Syst. Verz. 1, 1854, 61, p.p., nom. nud., non Steud. — *S. sumatrensis* (non Retz.) Miq., Fl. Ind. Bat. 3, 1856, 343; Ridl. & Winkl., Bot. Jahrb. 44, 1910, 525. — *S. multifoliata* Boeck., Linnaea 38, 1874, 510; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18; Clarke, Fl. Br. Ind. 6, 1894, 693; J. Linn. Soc., Bot. 34, 1898, 102; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 228; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 112; Clarke, Philip. J. Sc. 2, 1907, Bot. 106, p. min. p.; Ill. Cyp. 1909, t. 129 f. 3; Camus, Fl. Gén. I.-C. 7, 1912, 169; Merr., En. Born. 1921, 66; Ridl., Fl. Mal. Pen. 5, 1925, 178; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 55. [T.: Java: *Zollinger* 470, p.p.; Malacca: *Griffith* (K, NY); Tenasserim & Andamans: *Helper* 6132 (C, L, NY, P)]. — *S. multifoliata* var. *pilosula* Clarke, Fl. Br. Ind. 6, 1894, 693; J. Linn. Soc., Bot. 34, 1898, 103; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 112; Fl. Mal. Pen. 5, 1925, 179. [T.: Java: *Zollinger* 470, p.p.; Penang: *King's coll.* (K, dupl. in L)]. — *S. purpureovaginata* (non Boeck.) Merr., En. Philip. 1, 1923, 135, p.p.; Elm., Leaf. Philip. Bot. 10, 1938, 3540.

var. purpurascens — *Fig. 6f.*

Perennial with thick, shortly creeping, woody rhizome. *Stems* usually robust (but slender plants occur), erect, triquetrous, pubescent or glabrous, smooth or scabrid on the angles, up to 2 m tall and 7 mm thick. *Leaves* in the middle part of the stems and lower bracts clustered, in pseudo-whorls of 2—5, rigid, patent, gradually narrowed upwards, scabrous on the margins and the main nerves in the upper part, usually more or less pubescent especially beneath, rarely glabrous, 3—14 mm wide; sheaths usually pubescent, triquetrous, not winged, often purplish; contraligule short, broadly rounded, hirsute-ciliate. *Inflorescence* oblong, up to 50 cm long, consisting of a terminal panicle and up to 10 lateral ones, ultimately purple; lateral panicles solitary at the nodes or up to 4 together, pyramidal, on erect, long peduncles, with patent, scabrid branches; primary bracts foliaceous, shorter than to about as long as the inflorescence, secondary ones long, setaceous, ciliate at the dilated base. *Spikelets* 2—3 together, unisexual; male spikelets peduncled, lanceolate, 3—3½ mm long; stamens 3; anthers linear, 1½—2 mm long, with long, conical, somewhat bristly appendage of the connective; female spikelets at the base of the branches, obovoid when in fruit, cuneate at the base, 3½—4 mm long; male part reduced to a sterile glume. Cupula much smaller and thinner than in *S. sumatrensis*. *Disk* 3-lobed, triangular when flattened out, thick, yellow-brown; lobes triangular, obtuse, c. 1/3—1/2 as high as the nut, denticulate-crenulate at

the top. *Nut* small, not exserted from the glumes, ovoid, rather narrower than in the related spp., hirtellous at the top, glabrescent, finally dingy purplish to blackish, 2—2½ mm long, c. 2 mm wide.

Distribution: Burma, Thailand, Indo-China; in Malaysia: Sumatra and adjacent islands, Malay Peninsula, W. Java, very rare in Central Java, Borneo, Philippines (Palawan, Culion, Luzon, Samar, Leyte, Mindanao), Celebes (SE. Peninsula).

Ecology: In sunny and moderately shady localities, in secondary forests, brushwood, swampy grasslands, along roads, at low and medium altitudes, up to 1000 m.

Vernacular names: *Rumput sasayang*, r. *srانيت*, Mal. (Mal. Pen.), *daun kerisan*, Mal., *senayan* (Lingga), *rumput belidang* (Enggano), *perèdang* (Kutei), *tali juru* (N. Borneo).

SUMATRA and adjacent islands: *Anta* 438 p.p., 1081; *Bartlett & La Rue* s.n.; *van Borssum Waalkes* 1436, 1842; *Bünnemeijer* 113, 152, 1215, 1612, 1715, 6004, 6048, 6329, 6462, 6620, 6942, 7449, 7569, 7661, 7834; *Djadoek* 1121; *Docters van Leeuwen* 3234; *Hamel* 1126; *Henderson* SF 20241, SF 20289; *Huitema* 10; *Junghuhn* 485, 501; *Karta* 5; *Kobus* s.n.; *Koorders* 21505; *Lörzing* 5413, 12508; *Lütjeharms* 4211; *Nielsen* 1066; *Polak* 130; *Posthumus* 451; *Praetorius* s.n.; *Rahmat si Boeea* 1400, 1829, 6064, 9115; *Rappard* 89; *Rutten-Kooistra* 26; *van Steenis* 745 p.p., 845, 1066, 3377, 3856, 3857; *Surbeck* 70, 465; *Thorenaar* 158; *de Voogd* 1152, 1184; *van der Voort* 1; *Vorderman* s.n.

MALAY PENINSULA and adjacent islands: *Birch* 62; *Burkill* HMB 176, SF 921, SF 6439; *Burkill & Haniff* SF 13723, SF 15652; *Burkill & Shah* HMB 176; *Corner* SF 25908; *Curtis* 22 (= 1394); *Debeaux* 32; *Gaudichaud* 91 p.p., 92 bis, 120; *Goodenough* 1920, 10464; *Griffith* 6117, 6132; *Hume* 7447, 8707, 8960; *King's coll.* 1544, 1656; *Lake & Kelsall* 4098; *Machado* 11543; *Mohammed* FMS 21160; *Mohd Nur* 4795, FMS 21630; *Mohd Nur & Kiah* SF 7795; *Nauen* SF 35874, SF 38009, SF 38010, SF 38050, SF 38176, SF 38178; *Ridley* 2146, 6113, s.n.; *Samsuddin* FMS 42319; *Symington* 21413; *Seimund* 101, 113, 444, 541, 13195; *Sinclair* SF 39336; *Stoliczka* s.n.; *Vesterdal* 50, 582, 674; *Walker* 242; *Wyatt Smith* 55820.

W. JAVA and adjacent islands: *Backer* 1320, 1995, 3072, 10483, 14359, 18906, 23631, 26493, 35175; *Bakhuizen van den Brink* 5342, 6567, 6849, 6858, 7429; *Bakhuizen van den Brink* f. 915, 3287; *Beumée* A 286; *Bijhouwer* 258; *Blume* s.n.; *Boerlage* s.n.; *Bosbouwproefstation* E 1188; *Buwalda* 2920; *Danser* 5644; *Goering* 167; *Hallier* 562b, c; *van Hasselt* 93; *Horsfield* s.n.; *Kooper* 919; *Koorders* 31458, 40934, 41054, 41090, 41134, 41362, 41363, 41405; *Kuntze* 5009; *Lam* 281 J; *van Ooststroom* 12594; *Raap* 839; *Scheffer* s.n.; *Soegandi* 216; *van Steenis* 5350; *de Vries* 50; *Zollinger* 335, 377 p.p.; *Zwaardemaker* Z 92 A.

CENTRAL JAVA: *Backer* 4468; *Beumée* 4829 (both from Banjumas).

BORNEO and adjacent islands: *Amdjah* 247, 352, 353; *Miss Brooke* 8007, 8305, 9028; *Burbidge* s.n.; *Castillo* 504; *Castro* & *Melegrito* 1347; *Clemens* 21365 p.p., 21852, 21855, 28269; *Cuadra* A 3086; *Elmer* 20380; *Endert* 1572, 1738, 2021, 2646, 3246; *Enggoh* 10520; *Forman* 420; *Hose* 29; *Jacobs* 5599; *Jaibon* A 3213; *Kadir* A 2509; *Keith* 5977, 6232; *Langlassé* 39; *Meijer* 529, 1916, 2307, 2316; *Motley* 1297; *Posthumus* 2026; *Purseglove* P 4358; *Ridley* 11684; *Rutten* 412; *van Slooten* 2169; *Villamil* 323; *Hub. Winkler* 2895; *Yates* 69.

PHILIPPINES: *Cid* 78; *Clemens* s.n.; *Edaño* PNH 11900, PNH 11980, BS 24819; *Edaño & Gutierrez* PNH 37850; *Elmer* 16063; *Herre* 1009; *Merrill* 7243, 8229, 9523; *Ramos & Edaño* BS 31290, BS 46801, BS 46906; *Williams* 2373.

CELEBES: *Eyma* 3355; *Rachmat* 662.

17a. var. ophirensis (C. B. Clarke) Kern, comb. nov. — *S. multifoliata* Boeck. *var. ophirensis* C. B. Clarke, Fl. Br. Ind. 6 (1894) 693; J. Linn. Soc., Bot. 34, 1898, 103; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 113; Fl. Mal. Pen. 5, 1925, 179. [T.: Malay Peninsula, Mt Ophir: *Hullett* 869 (K)].

Very coarse and rigid; leaves very densely aggregated in the middle of the stem, their sheaths much overlapping; lobes of the disk shorter than in the typical *S. purpurascens*.

SUMATRA and adjacent islands. Tapianuli. Near Gunungtua, very poor soil, 100 m: *van der Voort* 17 (BO). East Coast. Bila, Aek Buro, in brushwood, 200 m: *Lörzing* 11592 (BO). Banka. G. Mangkol: *Kostermans* 767 (BO, L); Sungei Liat: *Teysmann* 6469 (BO). P. Lingga. G. Daik, in brushwood, 750 m: *Bünnemeijer* 6724 (BO). Riouw Arch. P. Karimon: *Bünnemeijer* 7884 (BO); *Ridley* 7109 (SING). St. Barbe Isl: *Langlassé* 941 (P, SING).

MALAY PENINSULA. Kedah. Kedah Peak: *Ridley* 5148 (K). Trengganu. P. Redang: *Yapp* 306 (L). Malacca. Mt Ophir, 3000 ft: *Hullett* 869 (K); *Ridley* 3122 (K, SING), 10006 (SING).

Notes. 1. It is difficult to place this remarkable variety because of the absence of nuts in the rather numerous collections (except for a single fruit in the type). Clarke treated *Hullett* 869 as a variety of *S. multifoliata* (= *S. purpurascens* in the present paper), with the remark that perhaps it might represent a distinct species. As long as no complete fruiting material is available this seems the best solution of the question, although it is also possible that we are dealing with a systematically unimportant form from infertile soil with poor fructification and vegetative propagation. I have seen it only from a restricted area.

Similar sterile plants with very densely crowded leaves have been collected in Thailand, but they cannot belong to *S. purpurascens* because of the distinctly winged leaf-sheaths.

2. Following Boeckeler, all subsequent authors referred the name *Scleria purpurascens* Steud. to the synonymy of *S. sumatrensis* Retz. Steudel's excellent type-specimen in the Paris Herbarium leaves no doubt whatever that *S. purpurascens* is quite distinct from *S. sumatrensis* and conspecific with *S. multifoliata* Boeck.

Sect. III. *Corymbosae* Boeck. ex Pax in E. & P., Pfl. Fam. II, 2, 1888, 121; Dalla Torre & Harms, Gen. Siph. 1909, 35; Clarke, Kew Bull., add. ser. 8, 1908, 132 (type species: *Scleria corymbosa* Roxb.). — *Scleria C. Corymbosae* Boeck., Linnaea 38, 1874, 536. — *Scleria sect. Lithospermeae* Clarke in Thiselt.-Dyer, Fl. Trop. Afr. 8, 1902, 493; Kew Bull., add. ser. 8, 1908, 132; Cherm., Bull. Soc. Bot. Fr. 76, 1929, 559; in Humbert, Fl. Madag., fam. 29, 1937, 253 [type species: *Scleria lithosperma* (L.) Sw.].

18. *Scleria corymbosa* Roxb. [Hort. Beng. 1814, 103, nom. nud.]; Fl. Ind. ed. 2, 3, 1832, 574; Clarke, Fl. Br. Ind. 6, 1894, 686; J. Linn. Soc., Bot. 34, 1898, 97; Hook. f. in Trim., Handb. Fl. Ceyl. 5, 1900, 95; Clarke, Philip. J. Sc. 2, 1907, Bot. 104; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 109, p.p.; Clarke, Ill. Cyp. 1909, t. 124, f. 1—3; Merr., En. Philip. 1, 1923, 133; Ridl., Fl. Mal. Pen. 5, 1925, 176, p.p. [T.: India: Chittagong (BM)]. — *S. androgyna* Nees in Wight, Contr. 1834, 117; Kunth, En. 2, 1837, 357; Steud., Syn. 2, 1855, 168; Thwaites, En. Pl. Zeyl. 1864, 353; Boeck., Linnaea 38, 1874, 536; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 18. [T.: India Or.: Wight 1906 (NY)]. — *S. corymbifera* Boeck., Linnaea 38, 1874, 537. [T.: Mt Khasia: Hook. f. & Thoms. hb. Ind. Or. (L, P)]. — *S. ridleyi* Clarke, Fl. Br. Ind. 6, 1894, 686; J. Linn. Soc.,

Bot. 34, 1898, 97; *ibid.* 36, 1903, 266; Ridl., *Mat. Fl. Mal. Pen.* (Monoc.) 3, 1907, 109; Clarke, *Ill. Cyp.* 1909, t. 124, f. 4; Camus, *Fl. Gén. I.-C.* 7, 1912, 160; Ridl., *Fl. Mal. Pen.* 5, 1925, 177. [T.: Singapore: *Ridley 1641* (K, SING)]. — *Fig. 6 g.*

Perennial with horizontal rhizome clothed by brown scales. *Stems* often robust (but slender specimens not rarely occur), erect, triquetrous, glabrous, smooth or scaberulous in the upper part, leafy throughout, up to 2 m by 1 cm. *Leaves* subcoriaceous, rigid, flat, exactly linear, abruptly narrowed to the obtusish tip, glabrous, smooth or somewhat scaberulous on the margins near the top, 7–25 mm wide; sheaths loose, triquetrous, not winged, smooth or scaberulous on the angles, glabrous; contraligule broadly ovate-triangular, glabrous, with a broad, fuscous, scarious margin. *Inflorescence* often copious, up to 75 cm long, leafy, consisting of a few to several distant fascicles of panicles; lateral panicles 2–3 together at the nodes, rarely solitary, dense, decompound, corymbiform, with patent branches; peduncles very unequal, compressed, up to 10 cm exerted from the sheaths; primary bracts leafy, erect, the lower ones usually overtopping the inflorescence; secondary bracts subulate. *Spikelets* bisexual and male, stramineous to dark brown, sessile, 4–5 mm long; male spikelets lanceolate; stamens 3; anthers c. 2 mm long, with a subulate appendage of the connective; bisexual spikelets broadly ovoid, with some male flowers besides the female one. *Disk* obsolete, reduced to a brown or reddish, narrow, triangular, minutely glandular band concrete with the nut. *Nut* ovoid, obtusely trigonous, with 3 shallow depressions at the base, acute, hardly or not umbonulate, shining, snowy white, rarely somewhat discoloured, 3–3½ by 2–2½ mm.

Distribution: From India and Ceylon to S. China, W. and NW. Malaysia, everywhere very local.

Ecology: In damp shady localities, in swamp forests, but also in wet places in the open, at low altitudes, up to 300 m.

Vernacular names: *Ilal badak*, Sund., *si marpandanpandan*, *si anit tombak*, *korisan*, Sum. E. C.

SUMATRA. East Coast Res.: *Rahmat si Boeea* 1858, 2726, 4514 (NY). *Tapianuli: Rahmat si Boeea* 5536 (NY). *Banka: Bunnemeijer* 1665 (BO); *P. Lingga: Bunnemeijer* 7048 (BO, L).

MALAY PENINSULA. *Kedah. Lubok Jerai: Sow CF* 34683 (KEP). *Perak: King's coll.* 1092 (L); *Dindings: Ridley* 8357 (SING), 10294 (K, SING). *Malacca: Griffith Kew Distr.* 6116 (K), *s.n.* (CGE); *Ridley* 10746 (SING); *Sinclair SF* 40562 (SING). *Johore: Feilding s.n.* (SING); *Teruya* 2585 (SING); *P. Langkawi: Corner s.n.* (BM, BO, K, L, SING); *Robinson* 6314 (BM, K, SING). *Penang: Curtis* 490 (K, SING). *Singapore: Ridley* 1641 (K, SING), 2131 (BM, K, SING).

W. JAVA. *Gunung Kantjana: Koorders* 41052 (BO); *Tjitjadas: van Steenis* 5363 (BO).

PHILIPPINES. *Palawan: Merrill* 9402 (BM, BO, K, L, NY, P, SING). *Culion: Merrill* 656 (BM, K, NY, SING).

Notes. 1. Ridley's remark (1907, 1925) that the lower sheaths are sometimes strongly winged, refers to a stout form of *Scleria terrestris* (*S. radula* Hance).

2. *Scleria ridleyi* Clarke is merely a slender, more or less depauperated condition of *S. corymbosa*. I fail to see any difference in the nuts (Clarke stated that they are "rather more pointed").

19. *Scleria lithosperma* (L.) Sw., Prodr. 1788, 18; Nees in Wight, Contr. 1834, 117; Kunth, En. 2, 1837, 349; Mor., Syst. Verz. 1846, 98; Zoll., Syst. Verz. 1, 1854, 61; Steud., Syn. 2, 1855, 173; Miq., Fl. Ind. Bat. 3, 1856, 344, incl. *var. β*; Boeck., Linnaea 38, 1874, 451; Benth., Fl. Austr. 7, 1878, 429; F.-Vill., Nov. App. 1882, 310; Vidal, Phan. Cuming. 1885, 156; Rev. Pl. Vasc. Filip. 1886, 285; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 17; Clarke, Fl. Br. Ind. 6, 1894, 685; J. Linn. Soc., Bot. 34, 1898, 96; *ibid.* 36, 1903, 265; K. Sch. & Laut., Nachtr. 1905, 60; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 227; Clarke, Philip. J. Sc. 2, 1907, Bot. 103; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 108; Clarke, Ill. Cyp. 1909, t. 123, f. 1—4; Ridl., J. Str. Br. R. As. Soc. no 59, 1911, 225; Valck. Sur., Nova Guinea 8, 1912, 711; Merr., Fl. Manila 1912, 120; Camus, Fl. Gén. I.-C. 7, 1912, 161, f. 21, 5; Stapf & Turr. in Gibbs, J. Linn. Soc., Bot. 42, 1914, 182; Merr., En. Born. 1921, 66; En. Philip. 1, 1923, 133; Kük., Bot. Jahrb. 59, 1924, 9, 58; Ridl., Fl. Mal. Pen. 5, 1925, 176; Core, Brittonia 2, 1936, 27; Elmer, Leaf. Philip. Bot. 10, 1938, 3540; Ohwi, Bot. Mag. Tokyo 56, 1942, 212; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 54; S. T. Blake, J. Arn. Arb. 35, 1954, 224; Nelmes, Kew Bull. no 3, 1955, 421. Based on *Scirpus lithospermus* L. — *Kaden Pullu* Rheede, Hort. Malab. 12, 1703, t. 48. — *Scirpus lithospermus* Linné, Sp. Pl. 1, 1753, 51. [T.: Habitat in India]. — *Schoenus lithospermus* (L.) L., Sp. Pl. ed. 2, 1, 1762, 65. Based on *Scirpus lithospermus* L. — *S. tenuis* Retz., Obs. 4, 1786, 13; Roxb., Fl. Ind. ed. 2, 3 (1832) 574. [T.: Ceylon, Koenig]. — *S. filiformis* Sw., Prodr., 1788, 19; Zoll., Syst. Verz. 1, 1854, 61 (*Zollinger 1166*). [T.: West Indies (cf. Core, Brittonia 2, 1936, 27—30)]. — *S. capillaris* R. Br., Prodr. 1810, 240; Kunth, En. 2, 1837, 349; Steud., Syn. 2, 1855, 173. [T.: Littora Novae Hollandiae intra tropicum, Arnhem S. Bay: *Brown 6069* (BM, K)]. — *S. glaucescens* Presl, Rel. Haenk. 1, 1828, 202; Steud., Syn. 2, 1855, 174, ex descr. [T.: In insula Luzon: *Haenke* (n.v.)]. — *Hypoporum capillare* (R. Br.) Nees, Linnaea 9, 1835, 303. Based on *Scleria capillaris* R. Br. — *Hypoporum lithospermum* (L.) Nees in Mart., Fl. Bras. 2¹, 1842, 172. Based on *Scirpus lithospermus* L. — *S. wightiana* Steud., Syn. 2, 1855, 176. Based on "*Hypoporum lithospermum* Nees in Wight Arn., Contr. 117" (should be: *Scleria lithosperma*).

var. lithosperma — *Fig. 6 h.*

Perennial with woody, shortly creeping, nodulose rhizome. *Stems* approximate or tufted, slender, erect, triquetrous, smooth and glabrous, 40—60(—90) cm by 1—2 mm. *Leaves* rigid, often somewhat aggregated towards the middle of the stem, narrowly linear, gradually narrowed to the obtusish tip, glabrous to sparsely pubescent, keeled, with revolute, scabrid margins, glaucescent, 1—4 mm wide; sheaths narrow, triquetrous, not winged, usually pubescent in the middle of the sides and glabrous on the angles, more rarely wholly glabrous, the lower ones nearly bladeless, purplish; contraligule short, obtuse, ovate or triangular, hirsute or ciliate, up to 2 mm long. *Inflorescence* narrow, very loose, up to 30 cm long, with a terminal panicle and 2—3 distant axillary ones; panicles ascending, almost spiciform or somewhat compound, with few spikelets; primary bracts foliaceous, usually much exceeding their panicles, bracteoles setaceous or glumiform, minutely scabrid on the margins. *Spikelets* bisexual (or a few male ones added?), solitary or in clusters of 2—3, with 1 female flower and a few to several male ones, 3—5 mm long; stamens 1(—2); anthers linear,

3/4—1 1/2 mm long; glumes ovate to lanceolate, acuminate, cuspidate or mucronulate, ferrugineous. Disk reduced to a narrow, brown, minutely glandular ring concrete with the base of the nut. Nut ovoid or oblong-ovoid, obtusely trigonous, minutely umbonulate, about as long as the glumes, at the base with 3 depressions which are rugulose by transverse, wavy, ferrugineous, minutely glandular ridges, otherwise smooth and shining (see var.!), 2—2 2/3 by 1 1/2—2 mm.

Distribution: Pantropical, the most widely distributed species of the genus; throughout Malaysia.

Ecology: In open places, along edges of forests, on rocky and sandy beaches, at low altitudes, up to 600 m (in New Guinea, Bismarck Mts, collected at 1000 m alt.).

Vernacular names: *Rumput sangit*, *r. kerisan*, *r. sianit darat*, *salit kechil*, *Mal.*, *faha tading*, Alor, *rumpul luwung*, Sumbawa, *tjaka ma gaolè*, Ternate, *èri*, Halmaheira; New Guinea: *momoab*, Wanigela, *widzi*, Onjob lang., *wammoam*, Miniafia lang.; Philip.: *dáat*, *katábad*, Tag., *talaid*, Bag.

SUMATRA and adjacent islands: Bartlett 8220; Bunnemeijer 2082; Kostermans 855; Lörzing 3633, 9516, 9579, 11572, 13785, 16355; Nielsen 1081; Rahmat si Boeea 923, 1757; van Steenis 3134; Veearts Sibolga 29; Yates 596, 675.

MALAY PENINSULA and adjacent islands: Corner SF 28157, SF 29802, s.n.; Curtis 1794; Goodenough 1299, 1926; Griffith 6129; Halim FMS 19280; Henderson SF 18459, SF 21364, SF 22467, SF 25047; Hervey s.n.; Holtum SF 17416, SF 38288; Ibrahim KF 19834; Kuntze 6172; Mohd Haniff SF 16023, SF 16024; Mohd Nur 4506, 31353; Monod de Froideville 651; Nauen SF 35863, SF 38179; Ridley 2, 1461, 3111, 10296, 14354, 15177, s.n.; Symington FMS 27770, FMS 28027, FMS 37333; Vesterdal 143; Wallich 3416 A, C.

JAVA and adjacent islands: Altmann 603; Backer 755, 806, 17970, 18186, 18217, 19080, 21002, 24842, 26461, 26495, 29329, 32487, 32488, 37567; Beumée A 564, 5519; van Borssum Waalkes 624; Buwalda 7550; Clason-Laarman F 43, 113; Coert 895; Dorgelo 1776 p.p.; Forman 172; Kooper 512b; Koorders 22077, 28245; Kostermans & van Woerden 175; Rant 948; van Steenis 5317; Valetton 86; Vermeulen 2; Zollinger 348, 3985.

LESSER SUNDA ISLANDS: Bloembergen 3112; van Borssum Waalkes 3022, 3109, 3146, 3173; Buwalda 4367; Colfs 122; Demandt & van Dillewijn 664; Jaag 1428; Kostermans c.s. 43; Posthumus 3379; van Steenis 7578; de Voogd 1698; Zollinger 1166.

BORNEO and adjacent islands: Beccari PB 1296; Clemens 9550; Fraser 1105; Gibbs 2689; Henderson SF 20211; Hombron s.n.; Hose s.n.; Purseglove & Mohd Shah P 4617; van Steenis 979, 992.

PHILIPPINES: Cuming 1817; Edaño PNH 11057, PNH 11109, PNH 11675; Elmer 11071, 17351; Hallier 4569; Leiberg 6144; McGregor BS 10120; Merrill 548; Ramos Phil. Pl. 1804, BS 8040, BS 32702, BS 32750; Ramos & Edaño BS 44282, BS 48992; Robinson & Ramos BS 11904; Whitford 603.

CELEBES and adjacent islands: Eyma 3424; Kjellberg 384, 438; Nielsen 810; Posthumus 2661.

MOLUCCAS: Anang 458, 619; Beguin 878, 1176, 1785; Buwalda 6030; Robinson Pl. Rumph. 435; Teysmann s.n.

NEW GUINEA and adjacent islands: Atasrip 164; Beccari PP 99; Brass 1634, 6259, 8059; Buwalda 5060, 5302; Crutwell 158; Hellwig 269; Hoogland 4709; Kanehira & Hatusima 13193; MacKee 1787; Naumann 111; Peekel 31; Pleyte 810; Reeder 843; van Royen 5340; Schlechter 13755, 13967; Zippel s.n.

19a. var. *linearis* Benth., Fl. Austr. 7, 1878, 430. [T.: Queensland, Brisbane R.: F. Müller (K)]. — *S. lithosperma* var. β Thwaites, En. Pl. Zeyl. 1864, 354. [T.: Thwaites CP 2627 (CGE, BM, BO, K, P)]. — *Hypoporum roxburghianum* Nees ex Boeck., Linnaea 38, 1874, 452, in syn. — *Hypoporum roxburghii* Nees ex Clarke, Fl. Br. Ind. 6, 1894, 686, in syn. — *S. lithosperma* var. *roxburghii* Clarke, Fl. Br. Ind. 6, 1894, 686; J. Linn. Soc., Bot. 34, 1898, 97;

Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 109; Clarke, Philip. J. Sc. 2, 1907, Bot. 104; Ill. Cyp. 1909, t. 123, f. 5; Merr., En. Philip. 1, 1923, 133; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, fam. 246, 1949, 54. [T.: *Thwaites CP 2627* (CGE, BM, BO, K, P)]. — *S. roxburghii* (Clarke) Domin, Bibl. Bot., Heft 85, 1915, 487; S. T. Blake, J. Arn. Arb. 35, 1954, 224. Based on *S. lithosperma* var. *roxburghii* Clarke. — *S. roxburghii* var. *australiensis* Domin, Bibl. Bot., Heft 85, 1915, 487. Based on *S. lithosperma* var. *linearis* Benth. — Fig. 6 i.

Whole surface of the nut rugulose by transverse wavy ridges, which are somewhat viscid on the upper margin.

Distribution: From Ceylon and India through Thailand and Indo-China to tropical Australia; according to Boeckeler also in Fiji; in Malaysia: Malay Peninsula (Johore, Dindings), Bawean, Luzon, Golo, Lesser Sunda Islands (Sumba, Wetar), Papua.

Note. The additional characters often given for discrimination are unreliable.

MALAY PENINSULA. Dindings. Lumut: *Ridley 7261* (SING). Johore. Batu Pahat, Minyak Buku: *Ridley 10995* (SING); Hulu Batu Pahat: *Lake & Kelsall s.n.* (SING). BAWEAN: *Dorgelo 10* (L).

LESSER SUNDA ISLANDS. Sumba. Laoro: *Iboet 336* (BO). Wetar. Near Ilwaki: *Bloembergen 3658* (BO, L); Mèta Leraï—Mèta Lahèla: *Bloembergen 3638* (BO, K, L, SING).

PHILIPPINES. Luzon. Luzon Central: *Loher 805, 806* (K); prov. Bataan, Lamac F. R., Mt Mariveles: *Merrill 3176* (K, P); *Williams 145* (NY); prov. of Rizal, Antipolo: *Ramos Phil. Pl. 535* (FI, U). Golo: *Merrill 11543* (BO, K, L, P, SING).

NEW GUINEA. Papua. Kanosia: *Carr 11035* (K, L, NY, SING); Tarara, Wassi Kussa R.: *Brass 8504* (BM, BO, U); Baroka, Mekeo distr.: *Brass 3774* (BO, L, NY).

Sect. IV. *Carphiformes* Kern, sect. nov.

Spiculae magnae, lanceolatae, dense conglomeratae, stricte unisexuales, glumis patenti-hirsutis. Nux perminuta, glumis multo brevior, dense tuberculata (typus: *Scleria carphiformis* Ridl.).

20. *Scleria carphiformis* Ridl., J. Fed. Mal. St. Mus. 6, 1915, 194; Fl. Mal. Pen. 5, 1925, 180. [T.: Kedah: *Ridley 5146* (SING; dupl. in BM, K)]. — *S. neesii* (non Kunth) Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 227. — *S. neesii* var. *borneensis* Clarke ex Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 115; Merr., En. Born. 1921, 66; H. Pfeiff. in Fedde, Rep. 26, 1929, 262. [T.: Kedah: *Ridley 5146* (SING; dupl. in BM, K). No Bornean collection cited]. — *S. neesii* var. *hirsutissima* Camus, Fl. Gén. I.-C. 7, 1912, 164. [T.: Cochinchina: *Thorel 566* (P)]. — Fig. 6 j.

Probably perennial, with very short rhizome and thickish, dark red roots. Stems slender, tufted, erect, triquetrous, smooth, retrorsely hirsute especially on the middle of the sides, to glabrous, 10—40 cm by $\frac{1}{2}$ —1 mm. Leaves aggregated towards the base of the stems, herbaceous, usually much overtopping the stem, exactly linear with obtuse tip, the midrib very prominent beneath, 2 lateral nerves prominent above, smooth, pubescent with long, white or greyish, patent hairs, sometimes glabrescent, 3—5 mm wide; sheaths narrow, triquetrous, pubescent, not winged, the lower ones purplish, bladeless or almost so; mouth of sheaths truncate or emarginate, not appendaged. Inflorescence consisting of a very dense, globose or semiglobose, terminal cluster of spikelets 1—2 cm across, and 1—2 smaller clusters (sometimes reduced to a single spikelet) lower down on

the stem, on capillary, more or less exerted peduncles in the axil of a leaf-like bract. *Spikelets* strictly unisexual, the nut-bearing ones without a trace of a male part, large, 8—9 mm long, ferrugineous or rufescent; male spikelets lanceolate, narrow, acute; stamens 3; anthers linear, 3 mm long, with reddish, bristly appendage of the connective; female spikelets ovate-lanceolate; glumes 5—6, lanceolate, acute, mucous, pubescent with long patent hairs especially near the margins and on the keel; style 3 mm. Cupula thick, large, $1\frac{1}{2}$ —2 mm. *Disk* almost as wide as the nut, not or hardly lobed, pale. *Nut* globose, distinctly apiculate by the remainder of the style, with 6 pits at the base, densely tuberculate, stellately hairy on the top of the tubercles, dull, white or greyish brown, $1\frac{1}{2}$ — $1\frac{2}{3}$ mm across.

Distribution: Cochinchina; in Malaysia: Malay Peninsula (Kedah: Kedah Peak; Trengganu: Padang Kandis; Pahang: Gunong Tahan), Borneo, SE. Celebes (Rumbia).

Ecology: On Kedah Peak in grassy spots surrounded by forest, on G. Tahan abundant on slightly damp, exposed rocks and screes, in Padang Kandis in sandy glam forest, in Celebes in moist monsoon forest; at low altitudes, up to 900 m.

MALAY PENINSULA. Kedah. Kedah Peak: *Evans & Gordon 22* (SING); *Holtum SF 15029* (SING); *Ridley 5146* (BM, K, SING). Trengganu. Padang Kandis, road to Kampong Temila, Besut: *Sinclair & Kiah bin Salleh SF 40432* (BO, K, L, SING). Pahang. Gunong Tahan: *Ridley 16033* (K, SING).

BORNEO. Without precise locality: *Motley 261* (as *Barber 261*, cf. Fl. Mal. I, 1, 1950, 36, sub Barber). Sarawak. Bako National Park, Lintang Path: *Sinclair & Kadim bin Tassim 10309* (L).

SE. CELEBES. Rumbia, Wambakowu: *Elbert 3084* (L).

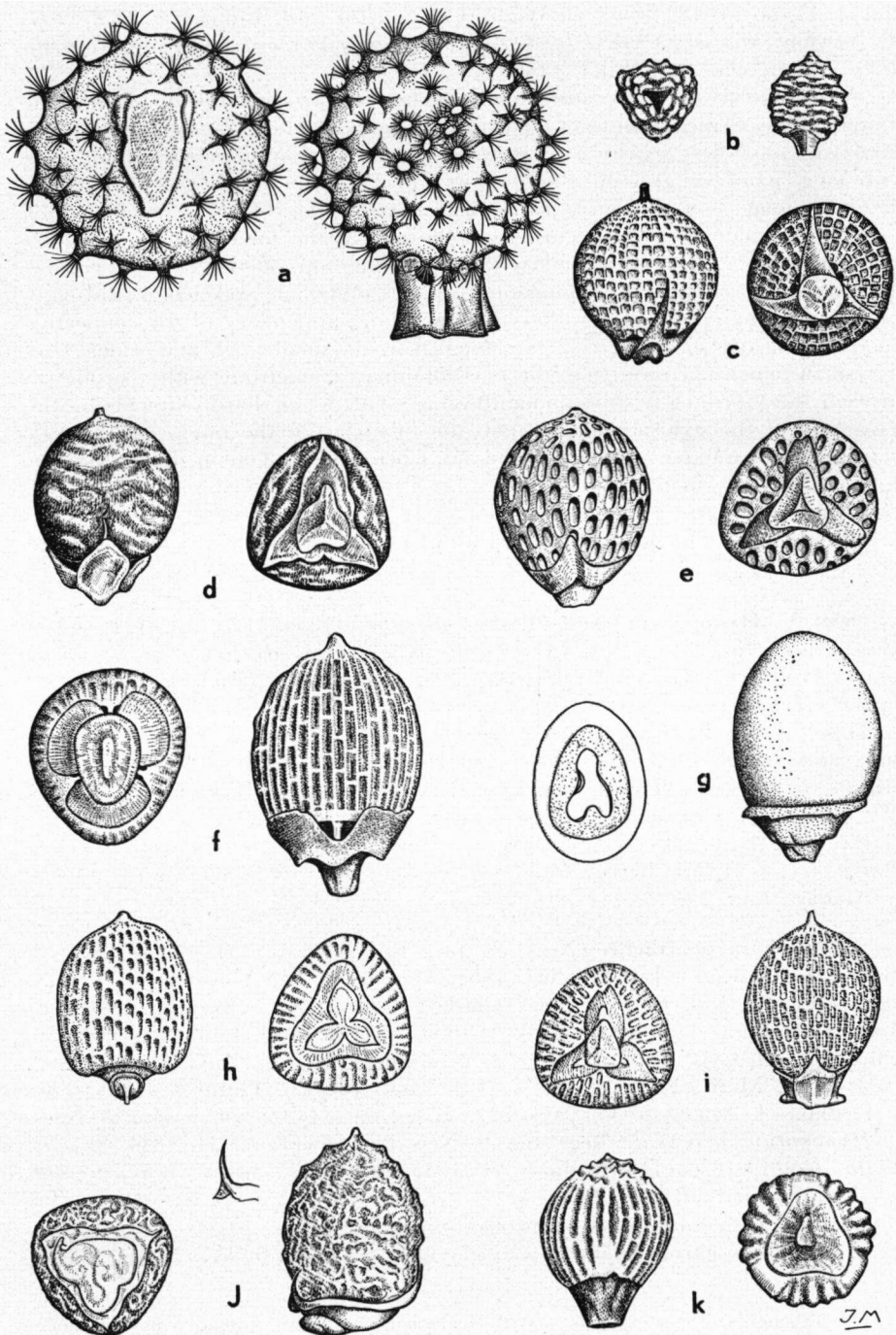
Notes. 1. The Kedah Peak plants are much less hairy than the others.

2. The specimens collected in Borneo by Motley were annotated by Clarke as follows: "Close to *Neesii*. *Scleria borneensis* sp. nova. Type of species. C. B. Clarke ms. Aug. 1890." Afterwards the name was changed into "*Scleria Neesii* var. *Borneensis*". Ridley published the latter name without citing Motley's collection, which he had not seen. Therefore *Ridley 5146* (SING) must be considered the type of the variety and also of *S. carphiformis* Ridl.

3. In my opinion Ridley was perfectly right in raising the taxon to specific rank. It differs from *Scleria neesii* in several important characters, which appear to be very constant.

21. *Scleria neesii* Kunth, En. 2, 1837, 358; Steud., Syn. 2, 1855, 175; Thwaites, En. Pl. Zeyl. 1864, 354; Boeck., Linnaea 38, 1874, 449; Clarke, Fl. Br. Ind. 6, 1894, 688, excl. specim. born.; J. Linn. Soc., Bot. 34, 1898, 99, excl. var.; Hook. f. in Trim., Handb. Fl. Ceyl. 5, 1900, 94; Camus, Fl. Gén. I.-C. 7, 1912, 164, f. 21, 6, excl. var. *hirsutissima* Camus. Based on *Hypoporum capitatum* Nees. — *S. stricta* Moon, Cat. Pl. Ceyl. 1824, 62, nom. nud.; H. Pfeiff. in Fedde, Rep. 26, 1929, 262. — *Hypoporum capitatum* Nees, Edinb. New

Fig. 7. Nuts and disks of: a. *Scleria neesii* Kunth; b. *S. pergracilis* (Nees) Kunth; c. *S. biflora* Roxb. ssp. *biflora*; d. *S. biflora* Roxb. ssp. *ferruginea* (Ohwi) Kern; e. *S. mikawana* Makino; f. *S. tessellata* Willd.; g. *S. annularis* Steud.; h. *S. novae-hollandiae* Boeck.; i. *S. parvula* Steud.; j. *S. tricuspidata* S. T. Blake; k. *S. laxa* R. Br. — a × 20, b—k × 10.



Phil. J. 17, no 34, 1834, 267; in Wight, Contr. 1834, 118; Linnaea 9, 1835, 303. [T.: Ceylon: *Macrae* (CGE)]. — *S. capitata* (Nees) H. Pfeiff. in Fedde, Rep. 26, 1929, 262, in syn., non Willd. (1805). — Fig. 7 a.

Very similar in habit and closely related to *S. carphiformis* Ridl., but undoubtedly specifically distinct from this. Usually smaller (rarely up to 30 cm tall), with narrower leaves 2—3 mm wide, and copiously pubescent all over with long, white or greyish, patent hairs. *Leaves* from much shorter than to about as long as the stems. *Inflorescence* consisting of a terminal cluster 1—1½ cm wide; no axillary clusters in the axil of the foliaceous bract, which therefore has become an ordinary leaf near the top of the stem. *Spikelets* usually slightly smaller, 6—8 mm long; glumes of female spikelets 4, distinctly mucronulate, hairy all over; anthers 1½ mm long; appendage of the connective smooth or nearly so. Style c. 2 mm long. Cupula small, c. 1 mm wide. *Disk* very small, much narrower than the nut, columnar, triquetrous, with a strong rib on each side, forming a stipe under the nut. *Nut* not or hardly apiculate (the remainder of the style not longer than the tubercles on the nut).

Distribution: Ceylon, Thailand, Cochinchina, Tonkin, Laos, Annam; in Malaysia: only in the Malay Peninsula (Perlis: Bukit Ketri), once collected, together with *Scleria thwaitesiana*.

Ecology: On Bukit Ketri in swampy places in "heath", at low altitudes.

Malay Peninsula. Perlis. Bukit Ketri: Henderson SF 22964 (K, SING).

Sect. V. Hypoporum (Nees) Endl., Gen. Plant. 1836, 112¹). — *Hypoporum* Nees, Edinb. New Phil. J. 17, 1834, 266 (type species: *Hypoporum pergracile* Nees); Wight, Contr. Bot. Ind. 1834, 118; Linnaea 9, 1835, 303. — *Scleria subgen. Hypoporum* (Nees) Clarke in Hook. f., Fl. Br. Ind. 6, 1894, 685; in Thiseit.-Dyer, Fl. Cap. 7, 1898, 293 et Fl. Trop. Afr. 8, 1902, 493; Kew Bull., add. ser. 8, 1908, 131; Cherm. in Humbert, Fl. Madag., fam. 29, 1937, 248. — *Scleria sect. Spicatae* Boeck. ex Pax in E. & P., Pfl. Fam. II, 2, 1888, 121, p.p.; Dalla Torre & Harms, Gen. Siph. 1900, 35. — *Scleria sect. Pergraciles* Clarke, Kew Bull., add. ser. 8, 1908, 131, nom. nud. — *Scleria sect. Hirtellae* Clarke, l. c. p. 132; Cherm., Bull. Soc. Bot. Fr. 76, 1929, 556; in Humbert, Fl. Madag., fam. 29, 1937, 249.

22. *Scleria pergracilis* (Nees) Kunth, En. 2, 1837, 354; Steud., Syn. 2, 1855, 176; Thwaites, En. Pl. Zeyl. 1864, 354; Boeck., Linnaea 38, 1874, 438; Clarke, Fl. Br. Ind. 6, 1894, 685; Clarke, J. Linn. Soc., Bot. 34, 1898, 96; Hook. f. in Trim., Handb. Fl. Ceyl. 5, 1900, 94; Clarke, J. Linn. Soc., Bot. 36, 1903, 266; Ill. Cyp. 1909, t. 121, f. 1—5; Camus, Fl. Gén. I.-C. 7, 1912, 160, f. 21, 1—4; Merr., Philip. J. Sc. 7, 1912, Bot. 75; En. Philip. 1, 1923, 134; S. T. Blake, J. Arn. Arb. 35, 1954, 224. Based on *Hypoporum pergracile* Nees. — *Hypoporum pergracile* Nees, Edinb. New Phil. J. 17, no 34, 1834, 267; in Wight, Contr. 1834, 118; Linnaea 9, 1835, 303. [T.: Silhet: Wallich 3406 (CGE; dupl. in L, P)]. — Fig. 7 b.

Annual with fibrous, stramineous to reddish roots. *Stems* very slender, tufted, erect, triquetrous, glabrous and smooth, 25—50 cm by ½—1 mm. *Leaves*

¹) Though l. c. not expressly stated, Endlicher's name was intended as a sectional one; cf. p. 345, Obs. sub *Aristolochia*.

rigid, flat or with revolute margins, narrowly linear, acutish, glabrous, scabrid towards the top, $\frac{1}{2}$ —2 mm wide; sheaths narrow, triquetrous, not winged, smooth, glabrous or sparsely pilose, truncate at the mouth or with a very short membranous appendage. *Inflorescence* linear, unbranched, spiciform, with triquetrous, smooth or antrorsely scabrid rhachis, consisting of 5—25 clusters of spikelets; clusters almost sessile, small, erect, with 2—5 spikelets, the lower ones 1—1½ cm distant, upper ones subcontiguous; bracts inconspicuous, not or hardly longer than the clusters of spikelets in their axils, membranous. *Spikelets* bisexual, small, obovate, 2½—3 mm long; glumes ovate-lanceolate, acute, mucous, keeled, glabrous, densely beset with reddish glandular streaks, those of the male flowers thinly membranous; stamens 2; anthers linear, c. 1 mm long, with bristly appendage of the connective. Cupula very small (c. ½ mm), triangular. *Disk* obsolete, concrete with the nut, forming a brown triquetrous stipe $\frac{1}{8}$ — $\frac{1}{2}$ mm high. *Nut* much shorter than the glumes, obtusely trigonous, slightly depressed, apiculate, lacuno-rugose, and tuberculate especially towards the top, glabrous, shining, white, 1—1⅓ mm long and wide.

Distribution: India, Ceylon, Thailand, Indo-China, Yunnan, tropical Africa; in Malaysia very rare: Sumatra (Karo Plateau), Philippines (Luzon: Bontoc; Mindanao: Cotabato), NE. New Guinea.

Ecology: On open slopes, at edges of swamps, in savannahs, at low and medium altitudes, up to c. 1500 m.

Vernacular names: *Sajat-sajat djelma*, Sum.; *kamiwa*, NE. New Guinea, Manki lang.; *bangbangló*, Philip., Bon.

SUMATRA. East Coast Res. Simelungan and Karolands: *Sohns* 55 (BO); Karo Plateau: *Sohns* 59 (BO); Lau Si-Momo: *Sohns s.n.* (BO, L).

PHILIPPINES. Luzon. Bontoc Subprov.: *Vanoverbergh* 889 (FI), 1500 (P).

NEW GUINEA. NE. New Guinea. Morobe Distr., near Manki village: *Miss Blackwood* 279 (K); Morobe Distr., Oomsis: *Henty NGF* 9861 (L).

Notes. 1. A specimen of this species in the Singapore Herbarium labelled "Java, Zollinger 348" is certainly not from Java. Specimens of this collection in other herbaria represent *Scleria lithosperma* (L.) Sw.

2. In Sumatra the strongly lemon-scented leaves are used as a remedy against fever and foot-and-mouth disease; in New Guinea they are eaten with salt.

3. The numerous spikelets I dissected were all bisexual, the ultimate one of each cluster frequently with much reduced androecium and gynoecium, not maturing a nut. Clarke, Fl. Trop. Afr. 8, 1902, 495, described the African specimens as having also many male spikelets, similar to the bisexual ones, except that they lack the third nut-bearing glume. Also Piérart mentions the presence of strictly male spikelets. They may have mistaken the reduced ultimate spikelets for male ones.

Sect. VI. Tessellatae Clarke in Hook. f., Fl. Br. Ind. 6, 1894, 686; in Thiseit-Dyer, Fl. Trop. Afr. 8, 1902, 494; Cherm. in Humbert, Fl. Madag., fam. 29, 1937, 254 (type species *Scleria tessellata* Willd.). — *Scleria subgen. Tessellatae* (Clarke) Clarke, Kew Bull., add. ser. 8, 1908, 132.

23. *Scleria biflora* Roxb., Fl. Ind., ed. 2, 3, 1832, 573; Clarke, Fl. Br. Ind. 6, 1894, 687; J. Linn. Soc., Bot. 34, 1898, 98; *ibid.* 36, 1903, 263; Ridl., Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 114; Clarke, Ill. Cyp. 1909, t. 127,

f. 1—2; Camus, Fl. Gén. I.-C. 7, 1912, 163, f. 21, 7; Ridl., Fl. Mal. Pen. 5, 1925, 180; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 56. [T.: from Bengal (BM)]. — *S. tessellata* (non Willd.) Nees in Wight, Contr. 1834, 118; Kunth, En. 2, 1837, 343; Steud., Syn. 2, 1855, 169; Thwaites, En. Pl. Zeyl. 1864, 354, excl. var. β ; Benth., Fl. Hongk. 1861, 399; Ochse & Bakh., Ind. Groent. 1931, 222; Veg. D. E. I. 1931, 221; Merr., En. Philip. 1, 1923, 135, p.p. (quoad BS 12221, 30025, Philip. Pl. 1444). — *S. propinqua* Steud., Syn. 2, 1855, 169; Miq., Fl. Ind. Bat. 3, 1856, 343. [T.: Java: Goering 154 (P)]. — *S. steudeliana* Miq., Fl. Ind. Bat. 3, 1856, 344; Sum. 1861, 262; Boeck., Linnaea 38, 1874, 475; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 17. [T.: Java, near Batavia; Sumatra, in Oppen-Angkola: *Junghuhn* (L, U)].

ssp. biflora — Fig. 7 c.

Annual with fibrous, dark red roots. *Stems* slender, tufted, erect, triquetrous, glabrous and smooth, leafy, (15—)30—45(—75) cm by 1—2 mm. *Leaves* herbaceous, weak, flat, exactly linear, abruptly narrowed to the obtusish tip, glabrous or sparsely pilose, scabrid on the margins in the upper part and on the midrib on the underside, 3—4(—8) mm wide; sheaths triquetrous, narrowly winged, retrorsely scaberulous on the angles or smooth, the lower ones purplish; contraligule from much broader than long to as broad as long, rounded, with narrow, membranous, ciliate margin. *Inflorescence* narrow, elongate, consisting of 2—4 panicles; terminal panicle 2—4 cm long, somewhat longer than the lateral ones, these remote, single or binate at the nodes, erect, on somewhat exserted, compressed, smooth peduncles; primary bracts erect, similar to the leaves, much longer than the panicles in their axil but usually not overtopping the inflorescence; secondary bracts subulate, 1—3 cm long. *Spikelets* either male and female, or male and bisexual; male spikelets lanceolate, 3—4 mm long; stamens 2—3; anthers c. 1 mm; appendage of the connective short, reddish, spinulose; nut-bearing spikelets obovoid, 4—4½ mm long, with 1(—2) male or barren flowers at the base. *Disk* deeply 3-lobed; lobes appressed, lanceolate, acute, gradually narrowed upwards, ferrugineous, reaching to ½ height of the nut. *Nut* globose or slightly depressed, regularly cancellate (the pits in vertical rows), beaked with the black or purplish persistent style-base, with 6 deep pits at the base (2 in each sinus of the disk-lobes), dull, white, ferrugineous-pubescent on the walls between the lacunae, (1½—)2 mm across; lacunae deep, square to broader than long.

Distribution: SE. Asia: from Ceylon, India, through Farther India to S. China, Formosa, Riu-Kiu Islands, eastwards to the Philippines and Celebes, southwards to Java, Madura, and Kangean.

Ecology: By grassy road-sides, in brushwood, as a weed in rice-fields and tea-plantations, often gregarious, at low altitudes (up to 900 m).

Uses: In Java the very young fragrant plants are eaten with the rice, as lalab, either raw or steamed.

Vernacular names: *Ilal*, *ilat huma*, *ilat lalab*, *ilat letik*, Sund., *kerisan*, Mal., *sesalit*, Alas lands.

N. SUMATRA: *Junghuhn* 506; *Lörzing* 3781, 8800, 11096, 13041; *Roesil* 671.

MALAY PENINSULA. Perak: *Hose* 47. Pahang: *Ridley* 2147. Selangor: *Hume* 7728 A. Malacca: *Goodenough* 1547. Johore: *Vesterdal* 134. Langkawi: *Corner s.n.* Penang: *Curtis* 1795; *Didrichsen* 3460; *Mohd Nur* SF 4545. Singapore: *Hose s.n.*; *Ridley* 5810, 8452, s.n.

JAVA: Goering 154. West Java: Backer 24098; Bakhuizen van den Brink 103, 1109, 3808, 5275, 5438, 6367, 7667, 7925, s.n.; Bakhuizen van den Brink f. 829; Boerlage s.n.; Hallier 560a, 560b; Junghuhn 540; Kern 8662; Van Ooststroom 12948; Van Steenis 5058, 6689, 11783, 12502, s.n.; de Wit 4154, 4165; Zippel s.n.; Zwaardemaker 22. Central Java: Bruggeman 852; Junghuhn 603; Kievits 1611, 1627, 2729.

KANGAEAN: Backer 27756.

MADURA: Backer 20141, 20210, 20442.

BORNEO. Kuching: Hose s.n.

PHILIPPINES. Luzon: Félix BS 30025; Loher 808 p.p.; Ramos Phil. Pl. 1444, BS 12221. Alabat: Ramos & Edaña BS 48162. Panay: Ramos & Edaña BS 30956.

CELEBES. Southwest Peninsula: van Steenis 10349. Southeast Peninsula: Beccari s.n.; Kjellberg 344.

Notes. 1. The roots strongly smell of camphor or cajaput.

2. Clarke (1894, 1903) thinks that *Scleria biflora* might be regarded as a variety of *Scleria tessellata*, only differing in the minute characters taken from the lobes of the disk. It is, however, a well-marked species, readily recognizable by the globose, deeply cancellate, black-tipped nut deeply pitted between the long disk-lobes.

23a. *ssp. ferruginea* (Ohwi) Kern, Reinw. 6, 1961, 76. — *Scleria ferruginea* Ohwi, Act. Phytotax. Geobot. 7, 1938, 37; Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 7. [T.: Riu Kiu Islands, Iriomote: *G. Koidzumi* (KYO)] — Fig. 7 d.

Very slender, sometimes almost 1 m tall. Leaves rigid, narrow, 1–2 mm wide. Disk-lobes shorter, reaching to $\frac{1}{3}$ height of the nut, suddenly caudate-mucronate from an ovate base. Nut at first often densely ferrugineous-tomentose; lacunae less deep, often partly longer than broad; walls between the lacunae broader; beak shorter.

Distribution: Riu Kiu Islands, Formosa, Thailand (Aran Prathet: Kerr 19565, BM, K), Cambodia (*Poillane* 27349, P), Malay Peninsula.

MALAY PENINSULA. Johore: Corner SF 37479 (BO, K, SING).

24. *Scleria mikawana* Makino, Bot. Mag. Tokyo 27, 1913, 57; Ohwi, Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 7; Nelves, Kew Bull., no 1, 1956, 107. [T.: Japan, prov. Mikawa: *Makino*; *Nagura*]. — *S. tessellata* var. β Thwaites, En. Pl. Zeyl. 1864, 354. [T.: Ceylon: *Thwaites* CP 3033 (BM, BO, K, P)]. — *S. tessellata* (non Willd.) Boeck., Linnaea 38, 1874, 470, p.p. (*Wight* 2030, 2916); Clarke, Fl. Br. Ind. 6, 1894, 686, p.p.; S. T. Blake, J. Arn. Arb. 35, 1954, 225, excl. synonym. — *S. glabroreticulata* De Wild., Pl. Bequaert. 4, 1927, 230, f. 4; Piérart, Lejeunea, Mém. 13, 1953, 43, t. 2, f. 9, 10, 22. [T.: Belgian Congo: *Vanderijst* 2232 (K)]. — Fig. 7 e.

Annual with fibrous, dark red roots. Stems slender but firm, tufted, erect, triquetrous, glabrous and smooth or sometimes slightly scaberulous, 30–80 (—120) cm by 2–3 mm. Leaves rather rigid, flat or plicate, exactly linear, rather abruptly narrowed to the obtusish or acutish tip, glabrous, smooth or scaberulous on the margins and main nerves in the upper part, $2\frac{1}{2}$ –4 (—7?) mm wide; sheaths narrow, triquetrous, not winged, smooth, glabrous or sparsely pubescent on the anterior side, the lower ones almost bladeless; contraligule membranous, short, semi-orbicular, ciliate. Inflorescence narrow, elongate, consisting of a terminal panicle and 1–2 lateral, remote, spike-like ones, with few spikelets, the terminal panicle somewhat longer than the lateral ones, these single

at the nodes, on scarcely exerted, stout, erect, smooth, ancipitous peduncles; primary bracts erect, similar to the leaves, longer than the panicle in their axil, upper and secondary ones subulate. *Spikelets* unisexual; male spikelets distinctly peduncled (peduncles $\frac{1}{2}$ — $1\frac{1}{2}$ cm long, the lowest ones often curved outwards, often reddish), lanceolate, pale or stramineous, 4—5 mm long; stamens 3; anthers linear, c. $1\frac{1}{2}$ mm, with conical, scabrid appendage of the connective; female spikelets c. 5 mm long, the glumes oblong-ovate, acute or mucronulate, more or less reddish with green keel; often a sterile glume besides the female flower. *Disk* thickish, deeply 3-lobed, yellowish or light green; lobes oblong, acute, sinuses obtuse. *Nut* globose or ovoid-globose, obscurely trigonous, minutely umbonulate, scrobiculate, $2\text{--}2\frac{1}{4}$ by c. 2 mm; lacunae rather deep, oblong to ovate, in longitudinal rows; walls between the lacunae broad, white, finally ferrugineous, forming a more or less continuous surface interrupted by the lacunae.

Distribution: Tropical Africa; from Ceylon and India to Japan; in Malaysia: a few times collected in New Guinea (Papua).

Ecology: In savannahs, on shores of lakes, by streams, in rain-forests, at low and medium altitudes, up to 1300 m.

NEW GUINEA. Papua. W. Div., Lake Daviumbu, Middle Fly River: *Brass* 7527 (U), 7875 (BM, BO, K, U), 7963 (U).

Notes. 1. *Scleria mikawana* is closely related to *S. tessellata* Willd. (Fig. 7 f), but in the latter (known from tropical Africa and India, not from Malaysia) the male spikelets are almost sessile, in any case distinctly longer than their peduncles, the nuts more cylindrical, less lacunose with narrower walls between the pits, and the disk-lobes broad, very obtuse, almost rectangular.

2. According to Piérart, l. c., the filaments are connate. In the flowers I examined they were more or less coherent when young, as is the case in several other species.

25. *Scleria annularis* [Kunth, En. 2, 1837, 359, nom. nud.]; Nees ex Steud., Syn. 2, 1855, 176; Boeck., Linnaea 38, 1874, 456; Clarke, Fl. Br. Ind. 6, 1894, 687; J. Linn. Soc., Bot. 34, 1898, 98; *ibid.* 36, 1903, 263, excl. specim. philipp. [T.: Ind. Or.; no specimen mentioned; Boeckeler cites "*Hook. & Thoms. hb. Ind. or. (sub Hypopor. Roxburghii* Nees." (P)] — *Hypoporum annulare* Nees, Linnaea 9, 1835, 303, nom. nud. — Fig. 7 g.

Annual with fibrous, dark red roots. *Stems* slender or medium, solitary or tufted, erect, very sharply triquetrous, glabrous or sparsely pubescent, retrorsely scabrous on the angles, 2—3-noded below the inflorescence, 30—100 cm by 2—3 mm. *Leaves* herbaceous, flat, gradually narrowed to the obtusish tip, glabrous or sparsely pubescent, antrorsely scabrous on the margins and the main nerves especially in the upper part, light green, 3—6 mm wide; sheaths sharply triquetrous, not winged, retrorsely scabrous, glabrous or pubescent on the anterior side; contraligule ovate or triangular, glabrous or ciliate, up to 3 mm long. *Inflorescence* narrow, elongate, consisting of a terminal panicle and 2—3 remote lateral ones, the terminal panicle 3—4 by $1\text{--}1\frac{1}{2}$ cm, somewhat longer than the lateral ones, these single at the nodes, more rarely binate, erect, their peduncles more or less (the lowest up to 10 cm) exerted from the sheaths, smooth or scabrid, ancipitous, 2-winged at the dilated top; primary bracts erect,

similar to the leaves, much longer than the panicles in their axils, overtopping the inflorescence; secondary bracts subulate, rigid, scabrous, much exserted from the panicles. *Spikelets* almost sessile (peduncle c. 1 mm long), glabrous, bisexual and male, or the male part in the nut-bearing ones reduced to a sterile glume; male spikelets lanceolate, c. 3 mm long; stamens 2—3; anthers linear, c. 1 mm long, with conical, almost smooth appendage of the connective; nut-bearing spikelets 4 mm long; glumes broadly ovate-lanceolate, mucronulate, scabrid on the keel, pale, ferrugineous-striolate. Cupula 3-lobed, 1 mm wide. *Disk* triangular with rounded angles, not lobed, purplish puncticulate; scar of cupula 3-lobed. *Nut* shorter than the glumes, ovoid, obtusely trigonous, laterally compressed, truncate at the base, obtuse, not apiculate, glabrous, very smooth and shining, white, $2-2\frac{1}{8}$ mm long, c. 2 mm wide, $1\frac{1}{2}-1\frac{3}{5}$ mm thick.

Distribution: Scattered throughout India, Central China (Hupeh: Ichang); once collected in Malaysia: New Guinea (Vogelkop, Kebar Valley).

Ecology: In grassland, altitude c. 540 m; possibly introduced.

W. NEW GUINEA. Vogelkop. Kebar valley, grassland E of aerodrome Andjai, among tall grasses, a few specimens, alt. 540 m: *van Royen* 3959 (L).

Notes. 1. Very similar in habit to the closely related *Scleria novae-hollandiae*, but stouter, and clearly distinct by its scabridity, and the ovoid, not apiculate, compressed, very shining nut.

2. The Philippine collection *Loher* 807, referred by Clarke to *S. annularis* (Philip. J. Sc. 2, 1907, Bot. 104), belongs to *S. novae-hollandiae*.

26. *Scleria novae-hollandiae* Boeck., *Flora* 58, 1875, 120; S. T. Blake, *Proc. R. Soc. Queensl.* 58, 1947, 48; J. Arn. Arb. 35, 1954, 225. [T.: Nov. Holland., Port Mackay: *Am. Dietrich* in herb. Luerssen (see S. T. Blake, *Blumea* 11, 1961, 223)]. — *S. laxa* (non R. Br.) Benth., *Fl. Austr.* 7, 1878, 428, p.p.; Domin, *Bibl. Bot.* 20, Heft 85, 1915, 488. — *S. annularis* (non Steud.) Clarke, *Philip. J. Sc.* 2, 1907, Bot. 104; Merr., *En. Philip.* 1, 1923, 133. — *S. merrillii* Palla, *Allg. Bot. Zeitschr.* 17, 1911, Beil., 8; Merr., *En. Philip.* 1, 1923, 134; Kük., *Bot. Jahrb.* 59, 1924, 10; Kanehira, *J. Dept. Agr. Kyushu Imp. Un.* 4, 1935, 282. [T.: Luzon: *Merrill in Kneucker, Cyp. et Junc. exsicc. no 249* (BM, C, K, L, NY, P)]. — *Fig. 7 h.*

Annual with fibrous, dark red roots. *Stems* slender, tufted, erect, triquetrous, glabrous and smooth, nodeless or 1-noded below the inflorescence, 25—45 cm by 1—2 mm. *Leaves* herbaceous, flat, exactly linear, rather suddenly narrowed to the obtusish or acutish tip, glabrous, scabrid on the margins and main nerves in the upper part, 2—4 mm wide, the lower ones reduced to the sheaths; sheaths triquetrous, not winged, smooth, shortly pubescent on the anterior side; contraligule short, rounded, with narrow, membranous, ciliate margin. *Inflorescence* narrow, elongate, consisting of a terminal panicle and (1—)2—3 very remote lateral ones, the terminal panicle somewhat longer than the lateral ones, these single at the nodes, erect, their peduncles more or less exserted from the sheaths, smooth, ancipitous, 2-winged at the dilated top; primary bracts erect, similar to the leaves, much longer than the panicles in their axils, overtopping the inflorescence; secondary bracts subulate. *Spikelets* usually unisexual, male and female, the nut-bearing ones sometimes bisexual, with 1 or 2 male flowers; male spikelets shortly peduncled (peduncle up to 3 mm long), narrowly lanceolate,

c. 4 mm long; stamens 2—3; anthers linear, 1—1½ mm long, with conical, scabrid appendage of the connective; nut-bearing spikelets 4½—5 mm long, with a barren or male flower besides the female one; glumes broadly ovate-lanceolate, mucronulate. Cupula deeply 3-lobed, 1 mm wide. *Disk* triangular with rounded angles, hardly lobed (sinuses very shallow, lobes broadly rounded), tightly appressed, greenish white; scar of cupula deeply 3-lobed. *Nut* ellipsoid or oblong-ellipsoid, with nearly parallel sides, very obtusely trigonous, truncate at the base, minutely umbonulate, smooth or slightly cancellate, glabrous, dull, white, finally often greyish, $2\frac{1}{4}$ — $2\frac{3}{4}$ by $1\frac{2}{3}$ —2 mm.

Distribution: N. and NE. Australia, Marianne Islands (Guam); in Malaysia: Philippines (Luzon), New Guinea (W. New Guinea: Hollandia; Papua).

Ecology: In savannahs and savannah-forests, in fallow rice-fields, on edges of swamps, at low altitudes.

PHILIPPINES. Luzon: *Loher* 807 (K); *Merrill in Kneucker* 249 (BM, C, K, L, NY, P); *Merrill* 9791 (BM, NY, P); *Ramos BS* 2029 (BO, NY, P); *Santos* 4638 (L).

NEW GUINEA. W. New Guinea. Hollandia: *van Royen* 4130 (L). Papua. W. Div., Oriomo River: *Brass* 6012 (BO, L). Daru Island: *Brass* 6427 (BM, BO, U).

Note. Among the *Scleria* material in the Hamburg Herbarium collected by Am. Dietrich there is no sheet agreeing with Boeckeler's description of *S. novae-hollandiae*; *Dietrich* 725 at Melbourne is therefore the neotype.

27. *Scleria parvula* Steud., Syn. 2, 1855, 174; Nelves, Kew Bull. no 1, 1956, 105. [T.: India Or.: *Hohenacker* 1295 (BM, K, L, P)]. — *S. tessellata* (non Willd.) Boeck., Linnaea 38, 1874, 470, p.p. (*Wallich* 3405 A; *Gardner* 951); ?F.-Vill., Nov. App. 1882, 310; Clarke, Fl. Br. Ind. 6, 1894, 686, p.p.; J. Linn. Soc., Bot. 34, 1898, 97, p.p.; *ibid.* 36, 1903, 267; Philip. J. Sc. 2, 1907, Bot. 104, p.p. (excl. *Merrill* 4370); Merr., Fl. Manila 1912, 210; Camus, Fl. Gén. I.-C. 7, 1912, 162; Merr., En. Philip. 1, 1923, 135, p.p. (quoad *Merrill* 4617; *Williams* 1970). — *S. uliginosa* Hochst. ex Boeck., Linnaea 38, 1874, 471. [T.: India Or.: *Hohenacker* 1295 (BM, K, L, P)]. — *S. fenestrata* Franch. & Savat., En. Pl. Jap. 2, 1879, 122, 549; Ohwi, Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 8. [T.: Japan: *Ono* (P)]. — *S. zeylanica* (non Poir.) Clarke, Philip. J. Sc. 2, 1907, Bot. 104, p.p. (quoad *Merrill* 4617). — *Fig. 7 i*.

Annual with fibrous, dark red roots. *Stems* slender, tufted, erect, triquetrous, glabrous and smooth, (10—)30—90 cm by 1—2 mm. *Leaves* herbaceous, flat, exactly linear, rather suddenly narrowed to the obtusish tip, glabrous, scabrid on the margins in the upper part, 2—5 mm wide; sheaths rather loose, triquetrous, winged, glabrous or sparsely pubescent, the lower ones bladeless or almost so; edge of wings retrorsely scabrid; contraligule short, rounded or truncate, with narrow, membranous, ciliate margin. *Inflorescence* narrow, elongate, the terminal panicle oblong, 2—4 cm long, somewhat longer than the 1—3 distant lateral fascicles, these erect or the lower ones often pendulous, 1—3 at each node, on slender, compressed, smooth or scabrid peduncles more or less exserted from the sheaths; primary bracts erect, similar to the leaves, much longer than the panicles in their axils, as long as or overtopping the inflorescence. *Spikelets* unisexual; male spikelets shortly peduncled (peduncles 1—3 mm long), lanceolate, 4—5 mm long; stamens 3; anthers linear, 1—1½ mm long, with conical, reddish, scabrid appendage of the connective; female spikelets 5 mm

long, without a barren or male flower besides the female one; glumes ovate, acute or mucronulate, stramineous with purplish margins to wholly purplish. Cupula hardly lobed, 1 mm wide. *Disk* 3-lobed; lobes thickish, appressed, ovate, acuminate, sometimes faintly bidentate at the top, greenish or yellowish. *Nut* shorter than the glumes, ellipsoid or subglobose, obsoletely trigonous, deeply cancellate, glabrous or ferrugineous-pubescent on the transverse raised lines, mucronate, shining, white, $2-2\frac{1}{3}$ by $1\frac{2}{3}-1\frac{4}{5}$ mm; lacunae rectangular, mostly longitudinally elongate, walls between the lacunae narrow.

Distribution: Tropical Africa; Nepal, India, Ceylon, Thailand, Indo-China, S. China, Japan, Korea; in Malaysia in the Philippines (Luzon) and NE. New Guinea.

Ecology: In swamps, wet open grasslands, in rain-forests in semi-shade, at low and medium altitudes, up to 1900 m.

Vern. *Drik*, New Guinea, Togoba; Philip.: *katábad*, Tag.

PHILIPPINES. Luzon. Prov. of Benguet: *Williams* 1970 (K, NY); dist. of Lepanto: *Merrill* 4617 (K); Bontoc subprov.: *Vanoverbergh* 952 (P).

NE. NEW GUINEA. Morobe Dist.: *Clemens* 8292a (B); Western Highlands, Mt Oga: *Saunders* 691 (BM, L).

28. *Scleria tricuspidata* S. T. Blake, *Blumea* 11, 1961, 220. [T.: Queensland: *S. T. Blake* 5291 (BRI)]. — *S. tessellata* var. *debilis* Benth., Fl. Austr. 7, 1878, 430. [T.: Rockingham Bay: *Dallachy*]. — *S. benthamii* (non Clarke) S. T. Blake, Proc. R. Soc. Queensl. 8, 1947, 50. — Fig. 7 j.

Annual with fibrous, dark red roots. *Stems* very slender, tufted, erect, triquetrous, glabrous or somewhat pubescent, usually retrorsely scabrid, sometimes almost smooth, nodeless or 1-noded below the inflorescence, (10—) 30—80 cm by 1—2 mm. *Leaves* (i. e. those not subtending a panicle) often all reduced to bladeless or shortly bladed sheaths, sometimes (like the lower primary bracts) herbaceous, flat, exactly linear, rather suddenly narrowed to the obtusish tip, scabrid on the margins and the main nerves in the upper part, pale green, 2—5 mm wide; sheaths narrow, triquetrous, wingless, sparsely pubescent; contraligule short, broadly rounded, ciliate. *Inflorescence* occupying by far the greater part of the stem, narrow, consisting of 3—5 very remote, dense partial panicles; terminal panicle 2—3 cm long, lateral ones somewhat smaller, usually binate at the nodes, more or less nodding, their peduncles much exerted from the sheaths, very long, filiform (but 2-winged at the dilated apex), smooth or scabrid, often purplish; primary bracts foliaceous, longer than the panicles in their axils, upper ones gradually shorter; secondary bracts setaceous, often curved. *Spikelets* shortly peduncled (peduncles 1—2 mm long), either male and female or male and bisexual; male spikelets linear-lanceolate, 3—4 mm long; stamens 2(—3); anthers linear, $1-1\frac{1}{2}$ mm long, with shortly produced connective; nut-bearing spikelets $4\frac{1}{2}-5$ mm long, unisexual or with some male flowers besides the female one; glumes ovate, acute or mucronulate, scabrid on the keel, pale ferrugineous with green keel. Cupula shallowly 3-lobed, c. 1 mm wide. *Disk* triangular, shallowly 3-lobed, appressed; lobes obtuse, with very narrow, reflexed margins, abruptly ending in a short, stiff, erect, subulate mucro, pale ferrugineous. *Nut* shorter than the glumes, elliptic-oblong, obscurely to obtusely trigonous, rugulose, somewhat tuberculate at the top, sparsely pubescent, apiculate, dull, white, $2\frac{1}{3}-2\frac{1}{2}$ by $1\frac{3}{4}-2$ mm.

Distribution: Australia (N. Territory, Queensland); in Malaysia: once collected in the Aru Islands.

Ecology: In moist places, in swampy ground, in open forests, often in *Melaleuca* stands, at low altitudes.

MOLUCCAS. Aru Islands. P. Trangan, Kp Batugojang, in *Melaleuca* savannah, few m: *Buwalda* 5555 (BO, L).

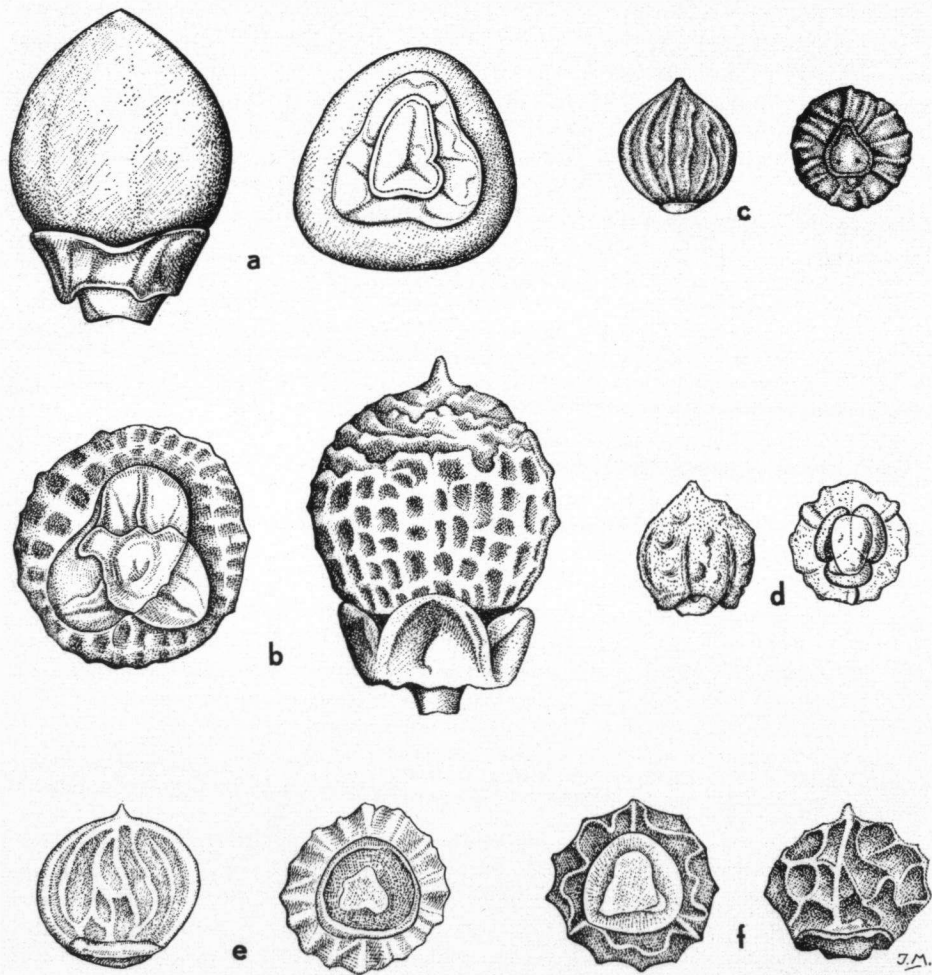


Fig. 8. Nuts and disks of: a. *Scleria thwaitesiana* Boeck.; b. *S. rugosa* R. Br.; c. *S. pygmaeopsis* Kern; d. *S. pygmaea* R. Br.; e. *S. caricina* (R. Br.) Benth.; f. *S. reticulata* (Holt.) Kern — All $\times 20$.

Note. Among Am. Dietrich's *Scleria* collections from Australia, which were worked up by Boeckeler, there are some specimens of *S. tricuspidata* (HBG, L), labelled "*Scleria novae-hollandiae*" or "*S. mackaviensis*", not in Boeckeler's handwriting. They do not answer Boeckeler's descriptions of these species, nor of any other he described.

29. *Scleria laxa* R. Br., Prodr. 1810, 240; Benth., Fl. Austr. 7, 1878, 428, p.p.; S. T. Blake, Proc. R. Soc. Queensl. 60, 1949, 52. [T.: Nova Hollandia: R. Brown 6068 (BM)]. — *S. zeylanica* (non Poir.) Clarke, Philip. J. Sc. 2, 1907, Bot. 104, p.p. (quoad *Loher 808*, p.p.). — *S. filipendula* S. T. Blake, Proc. R. Soc. Queensl. 58, 1947, 49. [T.: Queensland. S. T. Blake 5233]. — Fig. 7 k.

Annual with fibrous, dark red roots. *Stems* very slender, tufted, erect, more or less nodding at the top, triquetrous, glabrous and smooth, 1—2-noded below the inflorescence, 20—45 cm by 1—1½ mm. *Leaves* herbaceous, flat, narrowly linear, rather abruptly narrowed to the obtusish tip, glabrous, smooth or scabrid on the margins and the main nerves near the apex, pale green, 1—3 mm wide; sheaths narrow, triquetrous, wingless, upper ones glabrous, lower ones often reduced to the sheaths, pubescent, purplish; contraligule short, broadly rounded, ciliate. *Inflorescence* occupying by far the greater part of the stem, narrow, very loose, consisting of about 3 very remote fascicles of partial panicles, the terminal panicle not larger than the lateral ones, 1—2 cm long; peduncles 3—4 together at the nodes, exerted from the sheaths, more or less nodding, filiform, slightly incrassate at the apex, scabrid, 2—4 cm long; primary bracts similar to the leaves, erect, as long as or overtopping the inflorescence. *Spikelets* unisexual; male spikelets about as long as their peduncles, linear-lanceolate, 1½—2½ mm long; stamen 1; anther oblong-linear, ⅔—1 mm long, with shortly produced connective; female spikelets 3½—4 mm long, without a trace of a male part; glumes ovate, acute or mucronulate. Cupula very small, ⅔ mm wide, hardly lobed. *Disk* small, shortly 3-lobed; lobes obtuse, semi-orbicular. *Nut* globose, deeply longitudinally ribbed, with 3 of the ribs more prominent, more or less trabeculate between the ribs, slightly tuberculate at the top, umbonulate, glabrous, shining, white, c. 1⅔ mm across, the ribs not all reaching the base of the nut, but leaving a smooth triangular area above each disk-lobe.

Distribution: Queensland; in Malaysia: Luzon; to be expected in S. New Guinea, as it was collected on Thursday Island in Torres Strait.

PHILIPPINES. Luzon Central, Baloc-baloc: *Loher 808* p.p. (P).

AUSTRALIA. Thursday Island: *Jaheri s.n.* (BO).

Note. Closely related to *Scleria thwaitesiana*, from which it can be distinguished by the weaker stems and leaves, the much longer, nodding peduncles of the lateral panicles, the number of panicles arising from each node (3—4 in *S. laxa*, 1—2 in *S. thwaitesiana*), and the strongly ribbed or scrobiculate, apiculate nut.

30. *Scleria thwaitesiana* Boeck., Linnaea 38, 1874, 454. [T.: Ceylon: *Thwaites CP 3797* (BO, CGE, K, P)]. — *S. ceylanica forma b* Thwaites, En. Pl. Zeyl. 1864, 435. — *S. ceylanica* var. *angustifolia* Thwaites ex Boeck., Linnaea 38, 1874, 454, in syn. — *S. zeylanica* (non Poir.) Clarke, Fl. Br. Ind. 6, 1894, 687, p.p. (quoad *Thwaites CP 3797*); J. Linn. Soc., Bot. 34, 1898, 98, p.p.; Hook. f. in Trim., Handb. Fl. Ceyl. 5, 1900, 97, p.p. — Fig. 8 a.

Annual (?), with fibrous, dark red roots. *Stems* very slender, tufted, strictly erect, triquetrous, glabrous and smooth, 15—50 cm by 1—2 mm. *Leaves* rigid, canaliculate, narrowly linear, rather abruptly narrowed to the obtusish tip, glabrous, smooth or minutely scabrid at the top, green, 1—2(—3) mm wide;

sheaths narrow, triquetrous, wingless, glabrous, the lower ones reduced to the sheaths, purplish; contraligule very short, glabrous or minutely scabrid-ciliate. *Inflorescence* narrow, elongate, consisting of a terminal panicle 1—2 cm long, and 2—3 remote lateral fascicles; terminal panicle not pseudo-lateral, its bract not or but slightly overtopping the inflorescence; peduncles of lateral panicles single or binate at the nodes, setaceous, more or less exserted from the sheaths, smooth or slightly scabrid, often purplish; primary bracts similar to the leaves, erect, not overtopping the inflorescence. *Spikelets* unisexual; male spikelets about as long as their peduncles, linear-lanceolate, 2 mm long; stamen 1; anther oblong, $\frac{2}{3}$ mm long, with shortly produced, bristly appendage of the connective; female spikelets 4 mm long; glumes ovate, acute or mucronulate. *Disk* thin, appressed, triangular with rounded angles, hardly lobed, not cellular-glandular. *Nut* shorter than the glumes, subglobose, obtusely trigonous, not or hardly apiculate, smooth or nearly so, very shining, $1\frac{1}{3}$ — $1\frac{2}{3}$ mm across.

Distribution: Insufficiently known because of confusion with *Scleria rugosa*; Ceylon, Thailand; in Malaysia once collected in the Malay Peninsula, together with *Scleria neesii*.

Ecology: In wet localities, in open grassy ground, at low and medium altitudes, in Thailand up to 1300 m.

MALAY PENINSULA. Perlis. Bukit Ketri, at low alt.: *Henderson SF 22964 B* (SING).

Note. Clearly distinct from *Scleria rugosa* by the stiffly erect stems, the rigid, narrow leaves, the very short contraligule, the setaceous peduncles of the lateral panicles, the obtusely trigonous, muticous nut, and the hardly lobed disk, which is not cellular-glandular.

31. *Scleria rugosa* R. Br., Prodr. 1810, 240; Kunth, En. 2, 1837, 358; Steud., Syn. 2, 1855, 179; S. T. Blake, J. Arn. Arb. 35, 1954, 226. [T.: Endeavour River: *Banks & Solander* (BM)]. — *S. lateriflora* Boeck., Linnaea 38, 1874, 455; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 17; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 55. [T.: Ceylon: *Thwaites CP 3796* (BM, BO, CGE, P)]. — *S. onoei* Franch. & Savat., En. Pl. Jap. 2, 1879, 122 & 549; Ohwi, Mem. Coll. Sc. Kyoto Imp. Un. B 18, 1944, 9, incl. *var. pubigera*. [T.: Japan: *Ono* (P)]. — *S. flaccida* Clarke, Fl. Br. Ind. 6, 1894, 688, non Steud. (1855); J. Linn. Soc., Bot. 34, 1898, 98; Ill. Cyp. 1909, t. 127, f. 3—5. [T.: Assam: *Clarke 40744* (BM, K); *Kurz 2702* (K)]. — *S. zeylanica* (non Poir.) Clarke, Fl. Br. Ind. 6, 1894, 687, excl. syn. *S. thwaitesiana*; J. Linn. Soc., Bot. 34, 1898, 98; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 227; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 110; Clarke, Philip. J. Sc. 2, 1907, Bot. 104, p.p., excl. *Merrill 4617*; Merr., Fl. Manila 1912, 120; Camus, Fl. Gén. I.-C. 7, 1912, 163; Merr., En. Born. 1921, 67; En. Philip. 1, 1923, 136; Ridl., Fl. Mal. Pen. 5, 1925, 177. — *S. pubigera* Makino, Bot. Mag. Tokyo 27, 1913, 55. [T.: Japan, several collections mentioned]. — *S. tokusanensis* Nakai, Bot. Mag. Tokyo 30, 1916, 274, fide Ohwi. [T.: Corea austr.: *Mori 34 bis* (n.v.)]. — *Fig. 8 b*.

Annual, with fibrous, dark red roots. *Stems* slender, tufted, obliquely erect or decumbent, triquetrous, smooth, (5—)10—30(—40) cm by $\frac{1}{2}$ — $1\frac{1}{2}$ mm. *Leaves* herbaceous, weak, flat, rather abruptly narrowed to the obtusish tip, grass green or pale green, from glabrous to densely pubescent with pale, patent

hairs, smooth, 2—4 mm wide; sheaths loose, from sharply triquetrous to distinctly winged; contraligule short, semi-orbicular, ciliate. *Inflorescence* narrow, elongate, consisting of a terminal (but pseudolateral) panicle and 1—2 lateral, remote fascicles of panicles not markedly different from the terminal one; panicles single or binate at the nodes, on stout, triquetrous, winged, often recurved peduncles; primary bracts erect, similar to the leaves, the upper one as though continuing the stem, distinctly overtopping the inflorescence. *Spikelets* unisexual; male spikelets shortly peduncled, lanceolate, c. 2 mm long; stamen 1; anther oblong, $\frac{1}{2}$ — $\frac{2}{3}$ mm long; appendage of the connective short, ovate, smooth or nearly so; female spikelets 3—4 mm long; glumes ovate, acute or mucronulate, usually long-ciliate on the keel, rarely glabrous; a sterile glume besides the female flower sometimes present. Cupula hardly lobed, $\frac{2}{3}$ mm wide. *Disk* thick, appressed, shallowly 3-lobed, densely cellular-glandular; lobes obtuse, semi-orbicular. *Nut* shorter than the glumes, globose or slightly depressed, terete, apiculate, smooth or more less rugulose to lacunose especially in the upper half, often somewhat tuberculate at the top, shining, white or finally greyish, $\frac{1}{3}$ — $\frac{1}{4}$ mm across.

Distribution: Widely distributed from Ceylon and India to S. China, Formosa, and Japan, N. and NE. Australia, New Caledonia; in Malaysia: Malay Peninsula, W. Java, Madura, Kangean, Borneo, Lesser Sunda Islands (Tanimbar), Philippines (Luzon), Moluccas (Ambon), and New Guinea (Papua).

Ecology: In open swampy places, savannahs, fallow rice-fields, on rice-field dikelets, damp road-sides, at low altitudes, up to 500 m.

Vernacular names: *Rumput panjang*, Mal., *ilat bogo*, *ilat labab*, Sund.; Philip.: *dát-babáe*, *daát-parang*, *púgad-púgad*, Tag.

MALAY PENINSULA. Wellesley: *Agr. Off. Butterworth SF 37101* (SING). Kedah: *Spare 3773* (SING). Perak: *Berwick K 28* (SING); *Seimund s.n.* (SING); *Spare SF 36304* (BO, K, SING). Pahang: *Henderson SF 24446* (SING, NY); *Ridley s.n.* (SING). Selangor: *Monod de Froideville 577* (L). Malacca: *Ridley 1567* (SING). Johore: *Corner s.n.* (SING); *Henderson SF 38210* (K, SING); *Vesterdal 133* (C). Penang: *Curtis 1907* (K, SING); *Nauen s.n.* (SING). Singapore: *Corner s.n.* (SING); *Ridley s.n.* (SING); *Sinclair s.n.* (L).

JAVA. W. Java: *Bakhuizen van den Brink 6447* (BO, K, L, P, SING, U), 6484 (BO, L), 6496 (BO, L), 7434 (BO); *Bakhuizen van den Brink f. 3552* (U); *van Steenis 5280* (BO, L), 7495 (BO, L). Kangean: *Backer 30050* (BO). Madura: *Backer 20140* (BO), 20176 (BO). Karimundjawa: *Karta 369* (BO).

LESSER SUNDA ISLANDS. Tanimbar Is.: *Buwalda 4522* (BO, L).

BORNEO: *Barber 306* (K). Sarawak: *G. Hose s.n.* (SAR, SING). North Borneo: *Ramos 1130* (BO, L, P), 1775 (BO); *Wong Yun Liew E 25 A* (BM). South Borneo. Banjarmasin: *Motley 95* (K).

PHILIPPINES. Luzon: *Loher 808* (K, P, p.p.); *Merrill Phil. Pl. 525* (FI, U), 3665 (BM, BO, K, NY, P); *Ocfemia PNH 2251*; *Ramos Phil. Pl. 1451* (BM, BO, L, NY, P, SING), *BS 10905* (SING), *BS 21688* (K), *BS 22001* (BM, BO, L, NY, P, SING), *BS 27626* (P); *Robinson BS 9502*.

MOLUCCAS. Amboina: *Barclay s.n.* (BM); *Forsten s.n.* (L).

NEW GUINEA. Papua: *Brass 6013* (L). 7532 A (BM, BO, K, U). NE. New Guinea: *Himson 24* (L).

Notes. 1. A very variable species. The plants may be almost glabrous or softly pilose all over, the nuts smooth or tuberculate-rugose, the leaf-sheaths wingless or broadly winged, but I cannot find any correlation in these characters.

2. The way in which Clarke distinguished his *Scleria flaccida* from "*S. zey-*

lanica" is difficult to understand. In the latter he included *S. thwaitesiana*, in my opinion a markedly different species.

3. As was pointed out by S. T. Blake, l. c., *Scleria zeylanica* Poir. has nothing to do with the species described above, but is synonymous with *S. levis* Retz.

Sect. VII. Sphaeropus (Boeck.) Kern, stat. nov. — *Sphaeropus* Boeck., Flora 56, 1873, 89; Linnaea 38, 1874, 435 (type species: *Sphaeropus pygmaeus* Boeck.).

32. *Scleria pygmaeopsis* Kern, sp. nov. — Fig. 8c, 9.

Typus: Sumba: *De Voogd* 2513 (BO; dupl. in L, SING).

Herba annua, pergracilis, glabra, radicles fibrosis purpureis. Culmi solitarii vel fasciculati, filiformes, triquetri, laeves, simplices vel basin versus ramosi, 5—15 cm alti, $\frac{1}{3}$ — $\frac{1}{2}$ mm crassi. Folia basalia pauca, herbacea, flaccida, plana, linearia, acutissima, 7-nervia, costa nervorumque lateralium utroque latere unico tantum elevatis, fere laevia (nonnisi apice marginibus subtilissime serrata), 3—5 cm longa, $\frac{1}{2}$ —2 mm lata, vaginis purpureis. Inflorescentia laxa, culmi partem majorem occupans, e corymbulis 3—8 axillaribus, haemisphaericis, 1—2 cm remotis, fasciculato-contractis, 3—5 mm latis, pedunculis brevibus haud vel vix e vagina bractearum exsertis constructa. Bractearum foliaceae, imae 3—5 cm longae, superiores gradatim breviores, vaginis brevibus peranguste alatis, antice truncatis vel emarginatis. Spiculae masculae pauci-(c. 3-)florae, 1— $\frac{1}{2}$ mm longae, glumis membranaceis muticis; stamen 1, anthera parvula, oblonga, $\frac{1}{3}$ mm longa. Spiculae femineae uniflorae, $\frac{1}{2}$ —2 mm longae, pedunculo apice globoso-inflato; glumae 2, suboppositae, oblique patulae (haud conniventes), oblongo-ovatae, acutae, apiculatae vel mucronulatae, tenuiter 3—5-nerviae, integrae, marginibus hyalinis inferne purpureis; stylus tenuis, $\frac{1}{2}$ mm longus, stigmatibus tribus stylo aequilongis. Nux perminuta, globosa, basi truncata, apice brevissime acuminata, longitudinaliter costulata, costulis tribus prominentioribus, primo albidis, demum fusca vel nigricans, nonnisi $\frac{1}{2}$ — $\frac{3}{8}$ mm longa et lata, maturitate e glumis in rhachilla persistentibus prolapsa, disco obsoleto trigono albidis, cum fructu connatis.

MALAYSIA. Lesser Sunda Islands. E. Sumba, Lea plain, in swamp, alt. 500 m, May 28, 1936: *de Voogd* 2513 (BO, L, SING).

Note. Closely related to *Scleria pygmaea* R. Br., (Fig. 8d), from which it differs by the slenderer habit, the quite entire glumes, and especially by the somewhat smaller, etuberculate nut with obsolete triangular disk. In *Scleria pygmaea* the glumes are often slightly 3-lobed (side-lobes small, obtuse, more rarely absent), and the nut is about $\frac{4}{5}$ mm long and wide, tuberculate, with 3 crescent-shaped swellings at the base which surround the disk.

Sect. VIII. Diplacrum (R. Br.) Kern, stat. nov. — *Diplacrum* R. Br., Prodr. Fl. Nov. Holl., 1810, 240 (type species: *Diplacrum caricinum* R. Br.).

33. *Scleria caricina* (R. Br.) Benth., Fl. Austr. 7, 1878, 426; Ridl., J. Str. Br. R. As. Soc. no 23, 1891, 17; Clarke, Fl. Br. Ind. 6, 1894, 688; J. Linn. Soc., Bot. 34, 1898, 98; Ridl., J. Str. Br. R. As. Soc. no 46, 1906, 227; Mat. Fl. Mal. Pen. (Monoc.) 3, 1907, 111; J. Str. Br. R. As. Soc. no 59, 1911, 225; Fl. Mal. Pen. 5, 1925, 178; Kük., Bot. Jahrb. 69, 1938, 261. Based on *Diplacrum*

caricinum R. Br. — *Diplacrum caricinum* R. Br., Prodr. 1810, 241; Brongn. in Duperrey, Voy., Bot. 2, 1834, 160; Kunth, En. 2, 1837, 360; Endl., Iconogr. 1838, t. 25; Zoll., Syst. Verz. 1, 1854, 60; Steud., Syn. 2, 1855, 180; Miq., Fl. Ind. Bat. 3, 1856, 345; Sum., 1861, 262 & 602; Boeck., Linnaea 38, 1874,

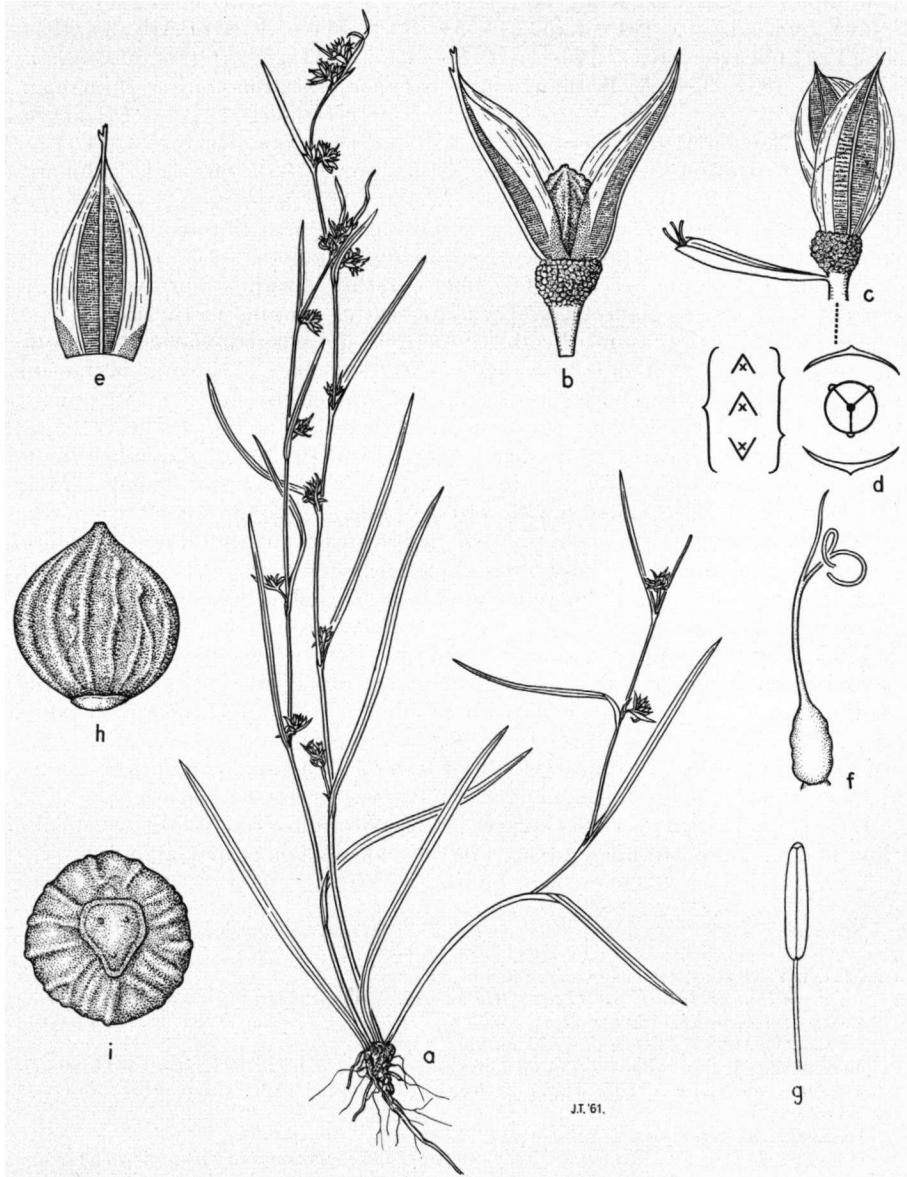


Fig. 9. *Scleria pygmaeopsis* Kern — a. Habit, $\times 1$; b. female spikelet, $\times 15$; c. female and male spikelet, $\times 15$; d. diagram of c; e. glume of female spikelet, $\times 15$; f. pistil, $\times 30$; g. stamen, $\times 45$; h—i. nut, $\times 45$. — From *De Voogd* 2513.

434; Goebel, Ann. Jard. Bot. Btzg 7, 1888, 132, t. 15, f. 21—29; Hook. f. in Trim., Handb. Fl. Ceyl. 5, 1900, 101; Clarke, J. Linn. Soc., Bot. 36, 1903, 267; Philip. J. Sc. 2, 1907, Bot. 106; Ill. Cyp. 1909, t. 134, f. 3; Rendle, J. Bot. 39, 1910, 179; Camus, Fl. Gén. I.-C. 7, 1912, 157; Merr., En. Born. 1921, 67; En. Philip. 1, 1923, 136; Kük., Bot. Jahrb. 59, 1924, 9; Uitt. in Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 53; S. T. Blake, J. Arn. Arb. 35, 1954, 233. [T.: Endeavour River: *Banks & Solander* (BM)]. — *Olyra malaccensis* Wall., Cat. 1831, 3540 A, B, nom. nud. — *Diplacrum tridentatum* Brongn. in Duperrey, Voy., Bot. 1834, t. 26. [T.: Ambon: *d'Urville* (P)]. — *Diplacrum zeylanicum* Nees in Wight, Contr. 1834, 119. [T.: Ceylon: *Macrae* (CGE)]. — *Diplacrum caricinum* var. *sumatranum* Miq., Sum. 1861, 602. [T.: Sumatra occ.: *Teysmann* (BO)]. — Fig. 8 e.

Very slender, nearly smooth and glabrous annual with fibrous reddish roots. *Stems* tufted, diffuse or procumbent, triquetrous, smooth, (2—)5—35 cm by $\frac{1}{2}$ —1 mm. *Leaves* herbaceous, flat, linear, rather abruptly narrowed to the acute tip, grass green, glabrous, scaberulous on the margins in the upper part, 1—5 cm by ($\frac{1}{2}$ —)3—5 mm; sheaths triquetrous, not winged, widened upwards, truncate at the top (without contraligule). *Inflorescence* occupying by far the greater part of the stem, composed of several to numerous (up to c. 20) remote, small, dense, axillary clusters; primary bracts leaf-like; peduncles usually just exerted from their sheaths, somewhat winged; ultimate bracts glume-like, more or less winged on the back; terminal spikelet of each cluster female. Male *spikelets* small, 1—2 mm long, few-flowered; stamen 1, anther oblong, c. $\frac{1}{3}$ mm long; female spikelets without a trace of male flowers, finally almost cylindrical, 2—3 mm long; glumes 2, subopposite, ovate-lanceolate, several-nerved, 3-lobed, central lobe herbaceous, cellular-reticulate above, cuspidate, lateral lobes shorter, membranous. *Disk* obsolete, adnate, with a scarcely prominent 3-angled margin. *Nut* hidden by the connivent glumes and falling with them, depressed-globular to ovoid-globular, irregularly ribbed (the longitudinal ribs more pronounced than the transverse ones and 3 of them prominent), slightly hispid at the top, white, finally more or less discoloured, $\frac{3}{4}$ —1 mm across.

Distribution: From Ceylon and India to S. China, Japan, Micronesia, and Queensland; almost throughout Malaysia, but everywhere scattered.

Ecology: In damp open places, on grassy sunny roadsides, river-banks, at low and medium altitudes, up to 1200 m; locally sometimes abundant.

Vernacular name: *Ilal*, Sund.

SUMATRA. West Coast: *Beccari* PS 875; *Meijer* 5727; *Teysmann* HB 1137. East Coast: *Hagerup* s.n.; *Lörzing* 9733, 12979.

MALAY PENINSULA. Perlis: *Henderson* SF 22965. Trengganu: *Vesterdal* 678. Pahang: *Burkill & Haniff* SF 17456; *Ridley* s.n.; *Sinclair* 8878. Johore: *Henderson* SF 38216; *Holtum* SF 38298; *Ridley* 11499, 15420; *Vesterdal* 132. Singapore: *Burkill* SF 705; *Meijer* 259; *Ridley* 53, 3806.

JAVA. W. Java: *Backer* 23868; *Bakhuizen van den Brink* 5182, 5417, 6485; *Korthals* s.n.; *van Steenis* 1767, 8184; *Zollinger* 1189. E. Java: *Coert* 1157; *Coert & Donk* 35.62.

LESSER SUNDA ISLANDS. Tanimbar Islands: *Buwalda* 4528.

BORNEO: *Jaheri* 99. Sarawak: *Clemens* 21367; *Hose* 348; *Ridley* 11691, s.n. SE. Borneo: *Motley* 86. N. Borneo: *Clemens* 11164; *Ramos* 1560. Labuan: *van Steenis* 17868. NE. Borneo: *Meijer* 2409.

PHILIPPINES: *Loher* 7157. Luzon: *Loher* 736; *Merrill* 3626; *Ramos & Edaño* BS 33507; *Shaw* 44. Bohol: *Ramos* BS 43276. Panay: *Ramos & Edaño* BS 30954.

Guimaras: Sulit PNH 11817. Bucas Grande: Ramos & Pascasio BS 35034. Mindanao: Merrill 8236.

CELEBES. Central Celebes: Eyma 3382; Kjellberg 3752. SE. Celebes: Elbert 3085.

MOLUCCAS. Ambon: Rant 795; Robinson 1886; Zippelius s.n.

NEW GUINEA. W. New Guinea: van Royen 3601a; Schram BW 7955; van Zanten 1008. NE. New Guinea: Baim s.n.; Clemens 8323 A; Himson 43. Papua: Brass 7842. Misool: Pleyte 925.

Note. In this species and the next one the epidermal cells on the upper side of the glumes of the female spikelets are much inflated. Though less pronounced, such cells are also found in the species of *Sect. Sphaeropus* (*S. pygmaea*, *S. pygmaeopsis*, *S. africana*) and in *Scleria rugosa*.

34. *Scleria reticulata* (Holt.) Kern, Reinw. 6, 1961, 71. — *Diplacrum reticulatum* Holt., Gard. Bull. Sing. 11, 1947, 295, f. 6. [T.: Pahang: Henderson SF 11941 (SING; dupl. in BO, L)]. — Fig. 8 f.

Closely related to *S. caricina* and very similar in habit to it. Female spikelets turbinate (not cylindric), $1\frac{1}{2}$ —2 mm by $1\frac{1}{4}$ — $1\frac{1}{2}$ mm; glumes ovate, acute, entire (not 3-lobed), purplish punctulate, with only the midnerve prominent, the sides faintly nerved. Nut depressed-globose, tuberculate-reticulate between the 3 longitudinal ribs, $\frac{3}{4}$ by $1\frac{1}{4}$ mm.

Distribution: East Bengal (Griffith, *Kew Distrib.* 6114, K, P); Burma (Kyauppyu Island: E. G. Wallace 9148, K, fide Holttum in litt.); Peninsular Thailand (Surat); in Malaysia: Malay Peninsula: Pahang.

Ecology: In the Malay Peninsula in damp spots in lalang (= *Imperata*) field.

PENINSULAR THAILAND. Surat. Ban Na: Yuang 51 (BO, K).

MALAY PENINSULA. Pahang. Gua Tipus, Chegar Perah: Henderson SF 11941 (BO, L, SING).

Doubtful species

1. *Scleria approximata* Hassk., Tijds. Nat. Gesch. Phys. 10, 1843, 118; Cat. Bog. 1844, 22. "Late major Rumph. amb. VI p. 20, t. 8. 2. Ielat." — No description; in Ind. Kew. referred to the synonymy of *S. sumatrensis* Retz. Rumphius's figure represents a *Scleria* of the group with pseudo-whorled leaves, probably *S. scrobiculata* Nees or *S. polycarpa* Boeck.; cf. Merrill, Int. Rumph. 1917, 108.

2. *Scleria waigiouensis* Steud., Syn. 2, 1855, 173; Miq., Fl. Ind. Bat. 3, 1856, 345. [T.: in insula Waigiou: d'Urville (n.v.)].

According to Clarke (J. Linn. Soc., Bot. 36, 1903, 266; Philip. J. Sc. 2, 1907, Bot. 106) = *Scleria scrobiculata* Nees. I have not found Steudel's type specimen in his herbarium (preserved in P); a specimen of *S. scrobiculata* from Waigeo, Offak: d'Urville 1 (P) may be an isotype of Steudel's species.

Excluded species

Scleria macrophylla Presl, Rel. Haenk. 1, 1828, 200, t. 3, f. 25; Nees in Wight, Contr. 1834, 116; Kunth, En. 2, 1837, 356; Steud., Syn. 2, 1855, 170; Miq., Fl. Ind. Bat. 3, 1856, 343; F.-Vill., Nov. App. 1882, 310. [T.: "Habitat in insula Luzon"].

The type is certainly not from Luzon, but from tropical South America or Mexico. Clarke (Fl. Br. Ind. 6, 1894, 693) wrongly reduced it to *Scleria bancana* Miq. Cf. Merrill, En. Philip. 1, 1923, 136; H. Pfeiffer, Mitt. Inst. Allg. Bot. Hamb. 7, 1928, 175; Core, Brittonia 2, 1936, 38.

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